

FIG. 1

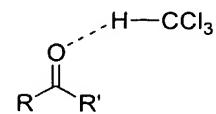


FIG. 2

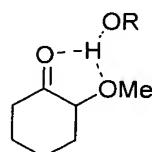


FIG. 3

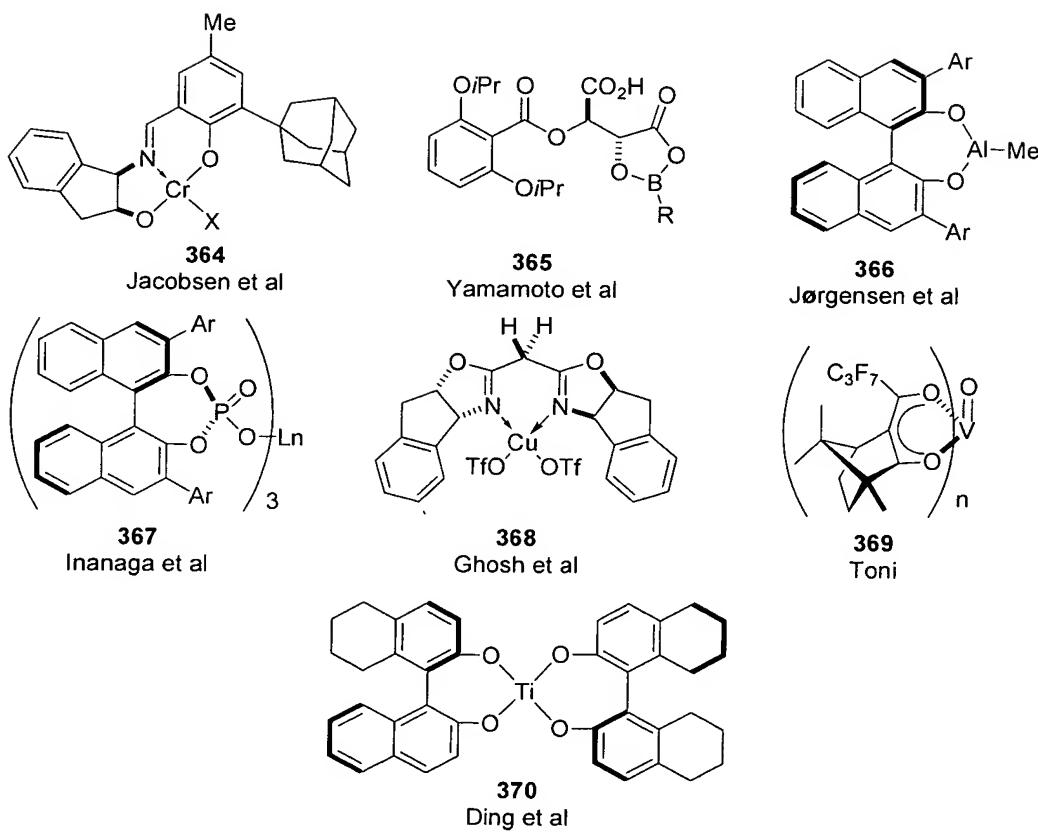


FIG. 4

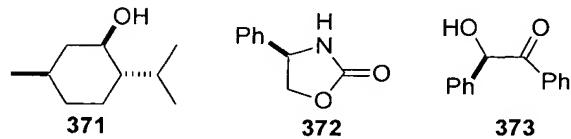


FIG. 5

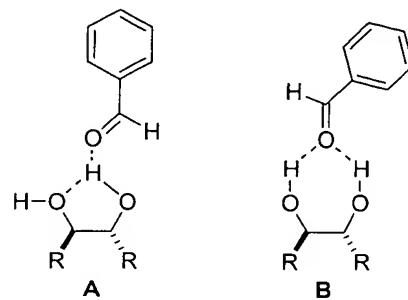


FIG. 6

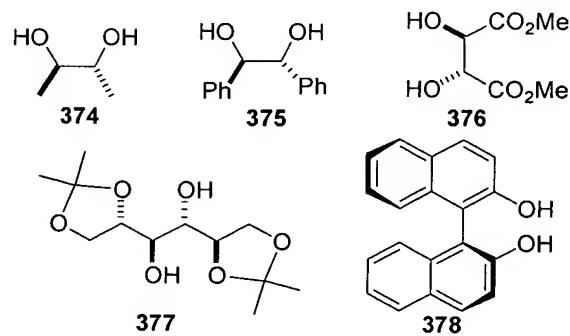


FIG. 7

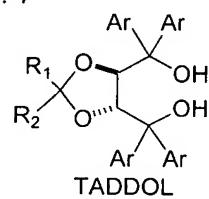


FIG. 8

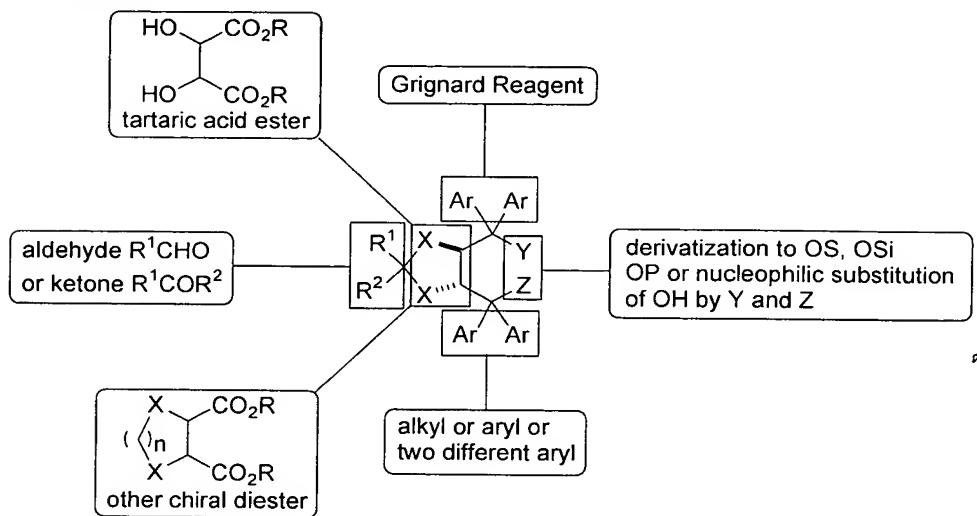


FIG. 9

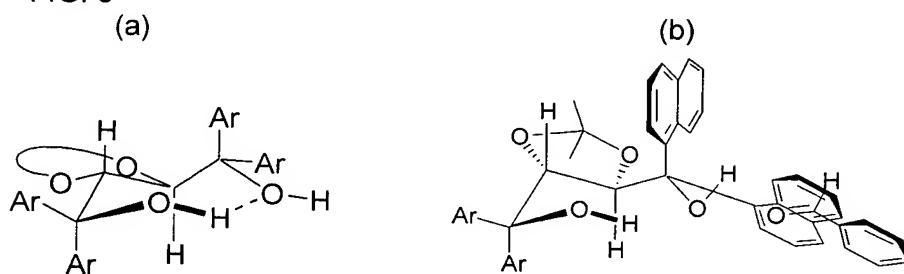


FIG. 10

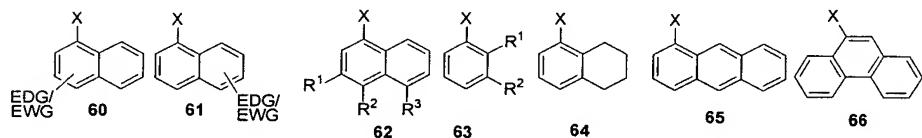
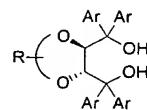
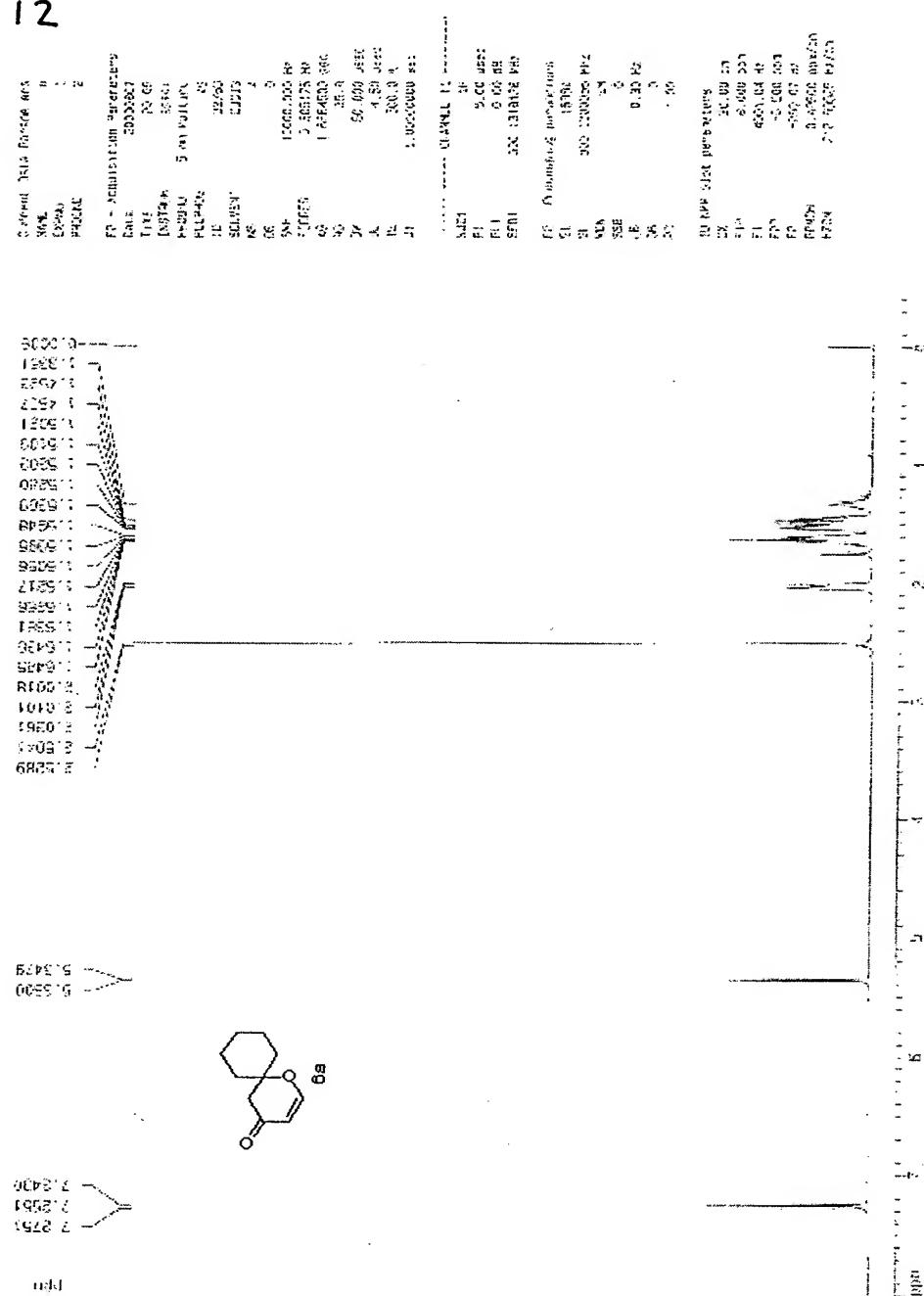


FIG. 11



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 12



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 13

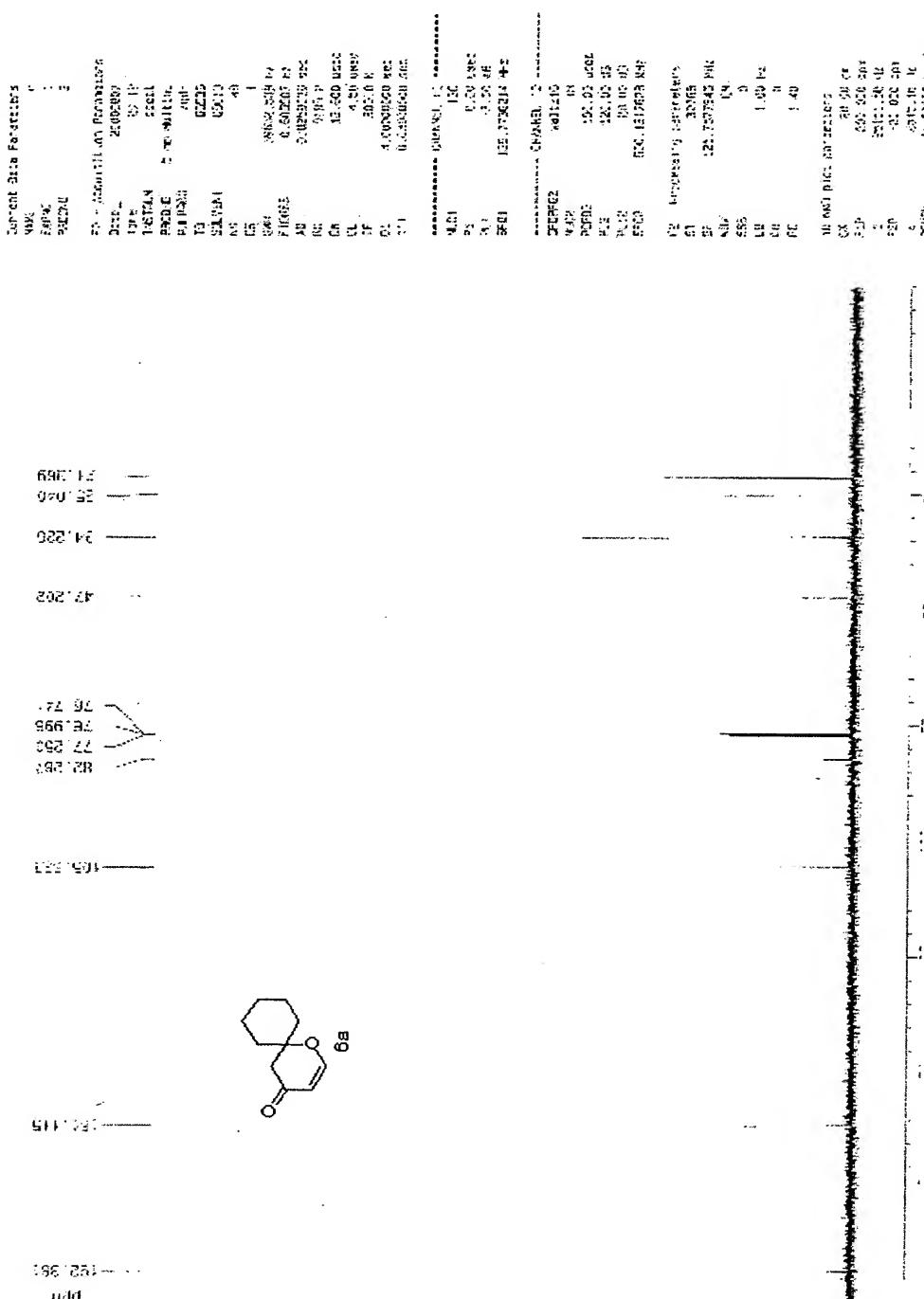


FIG. 14

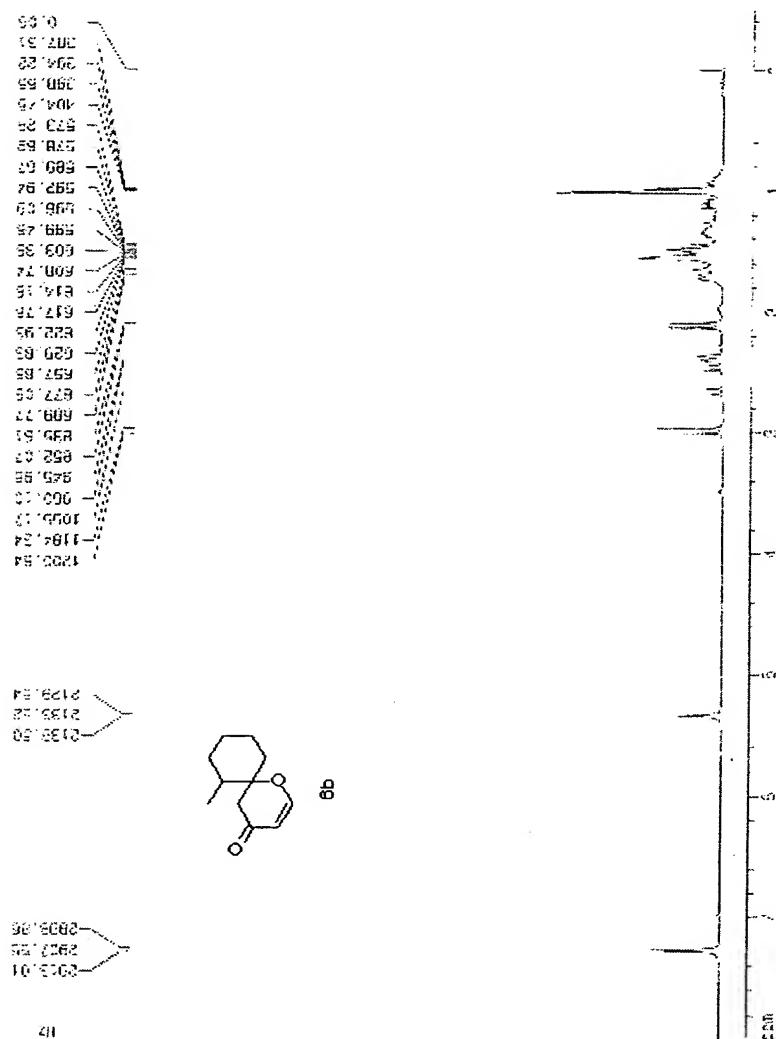


FIG. 15

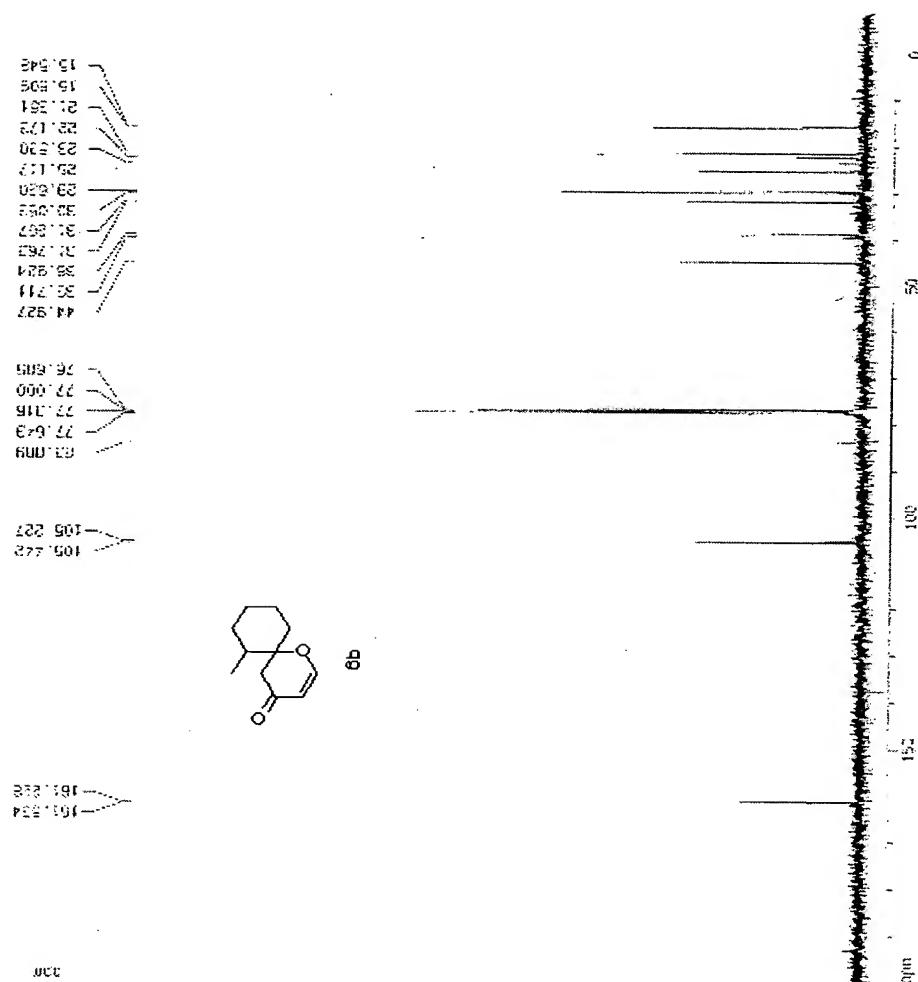
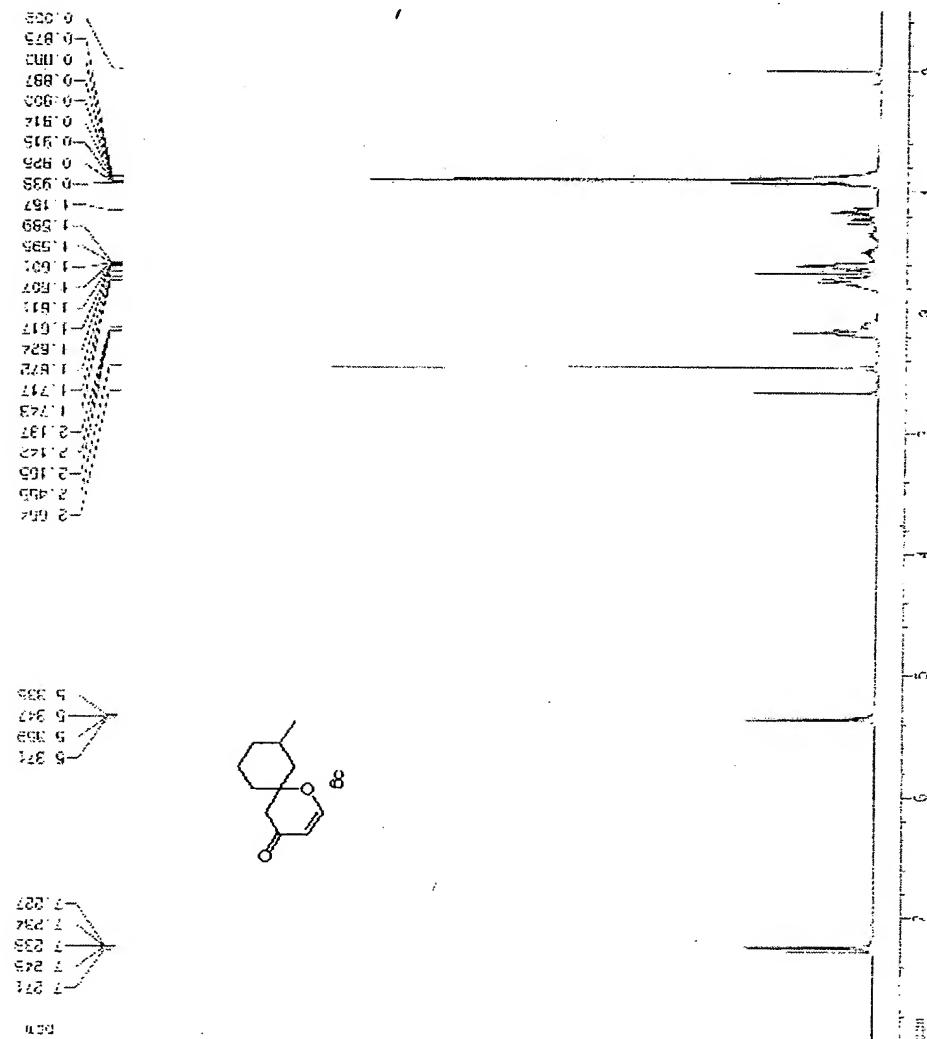


FIG. 16



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 17

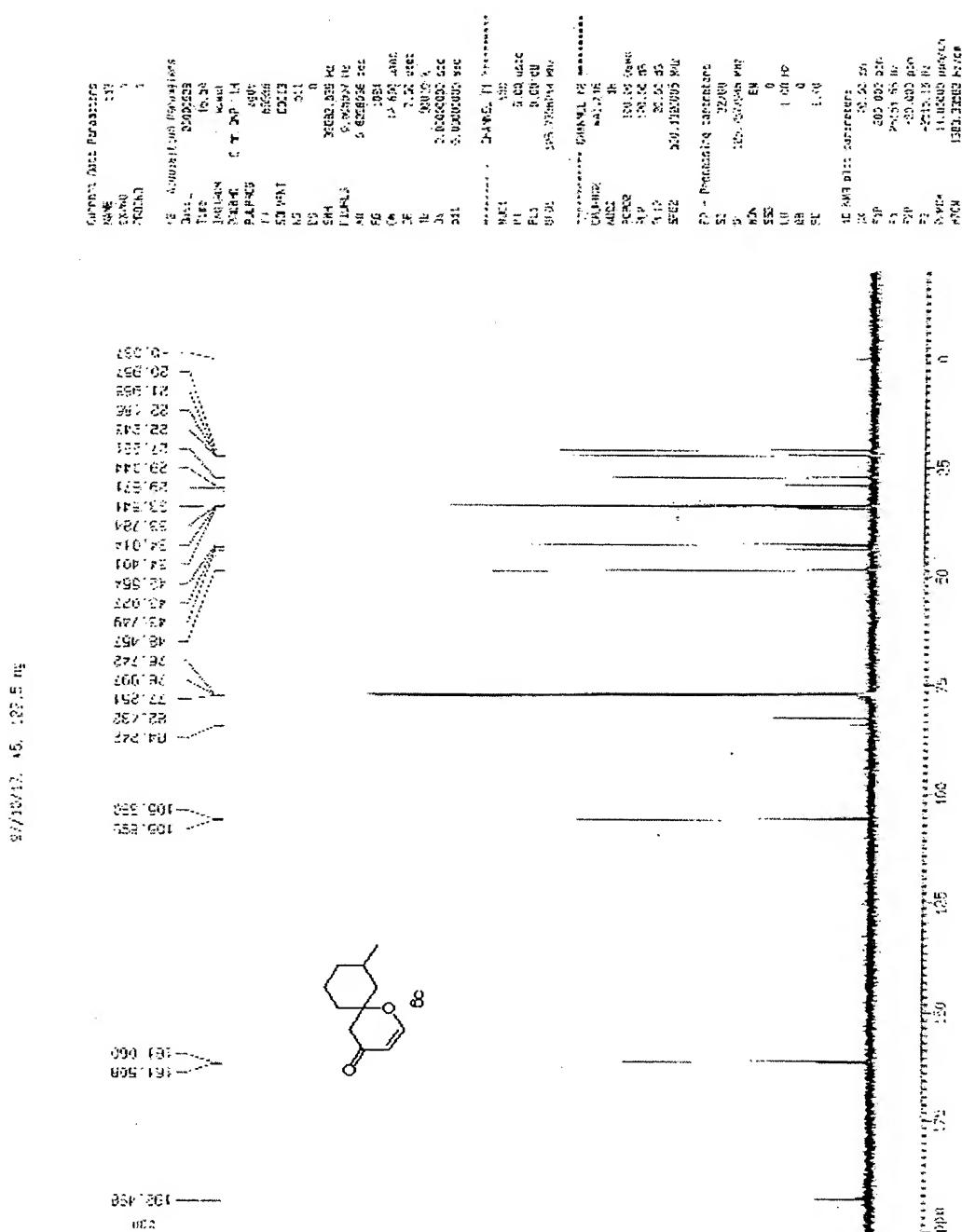


FIG. 18

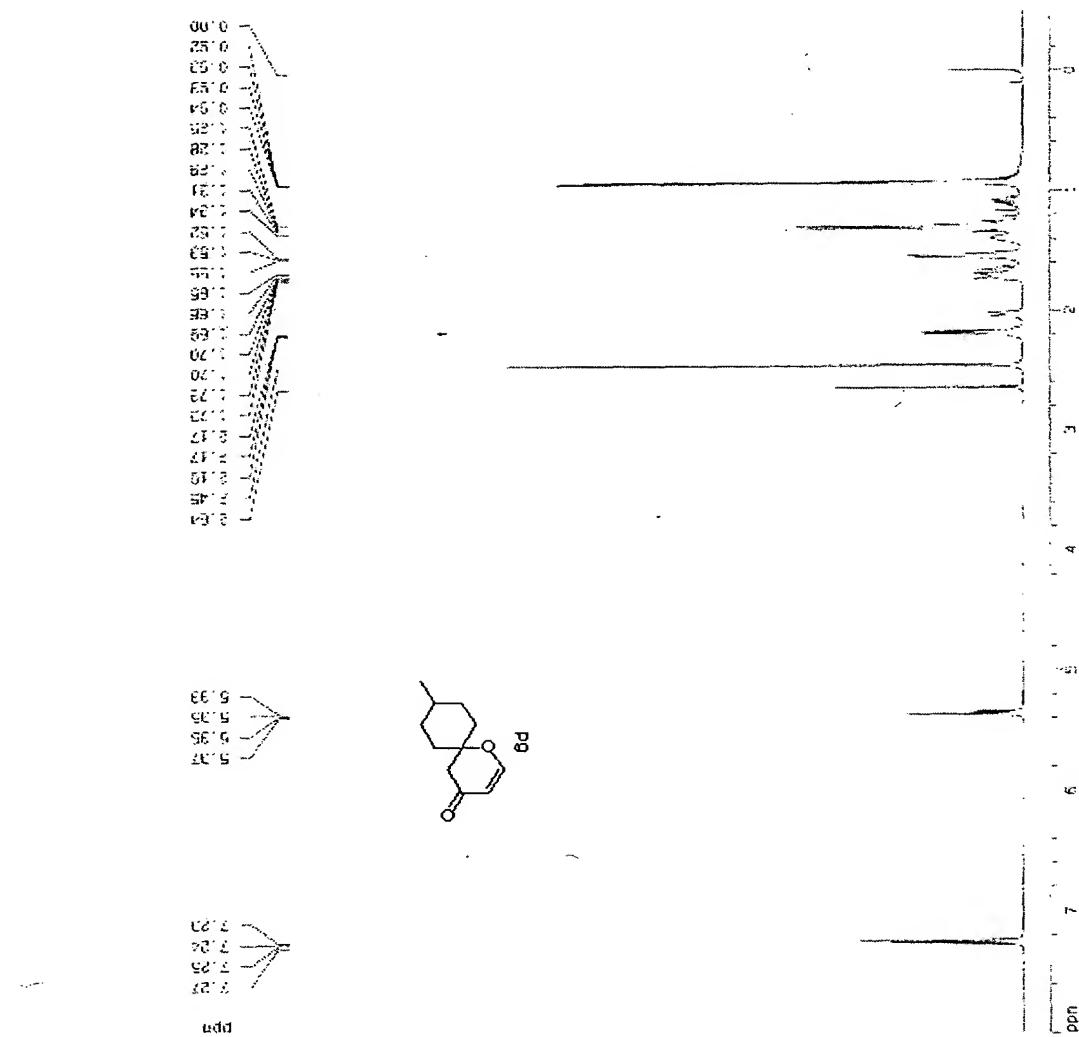
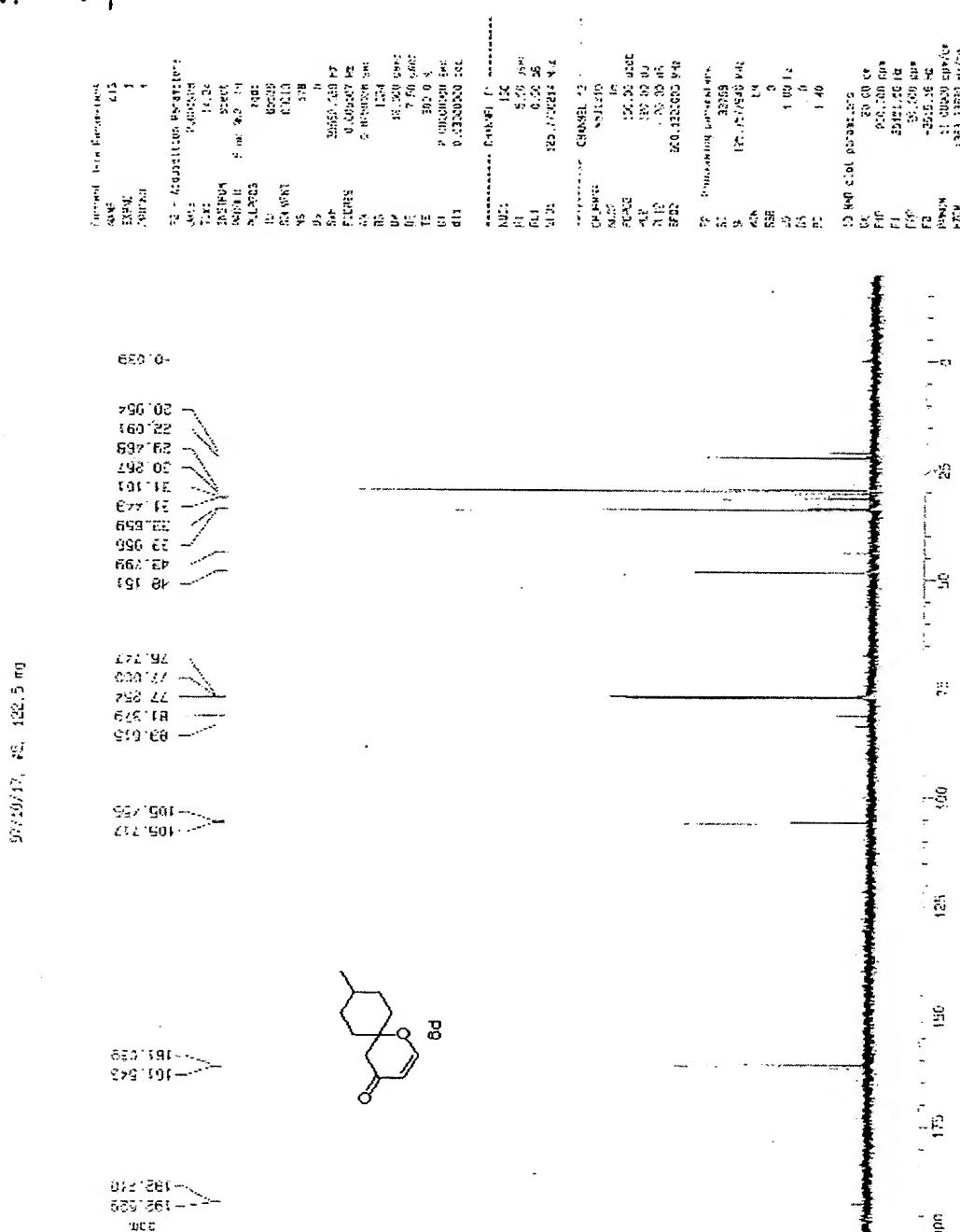
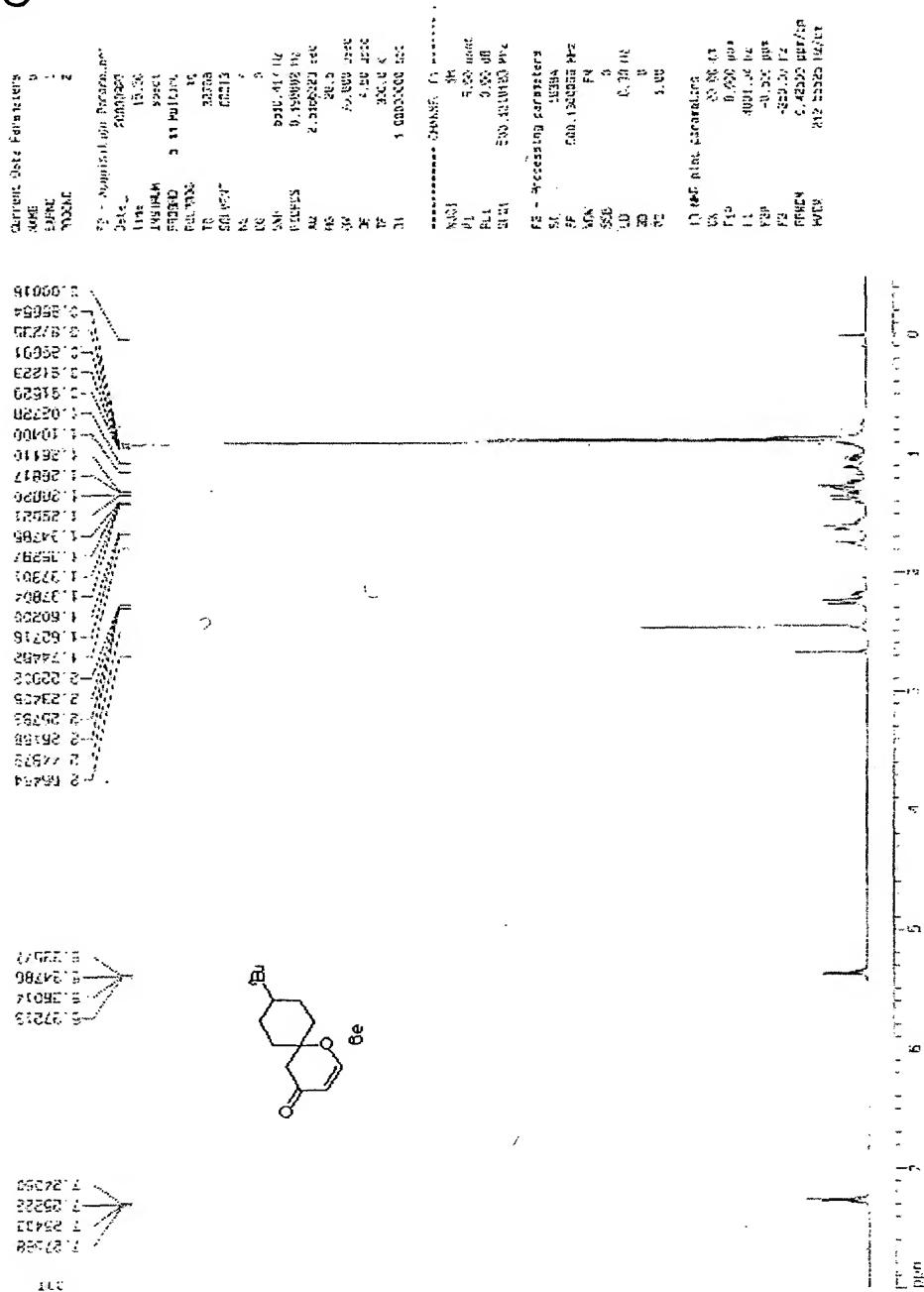


FIG. 19



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 20



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and
Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 21

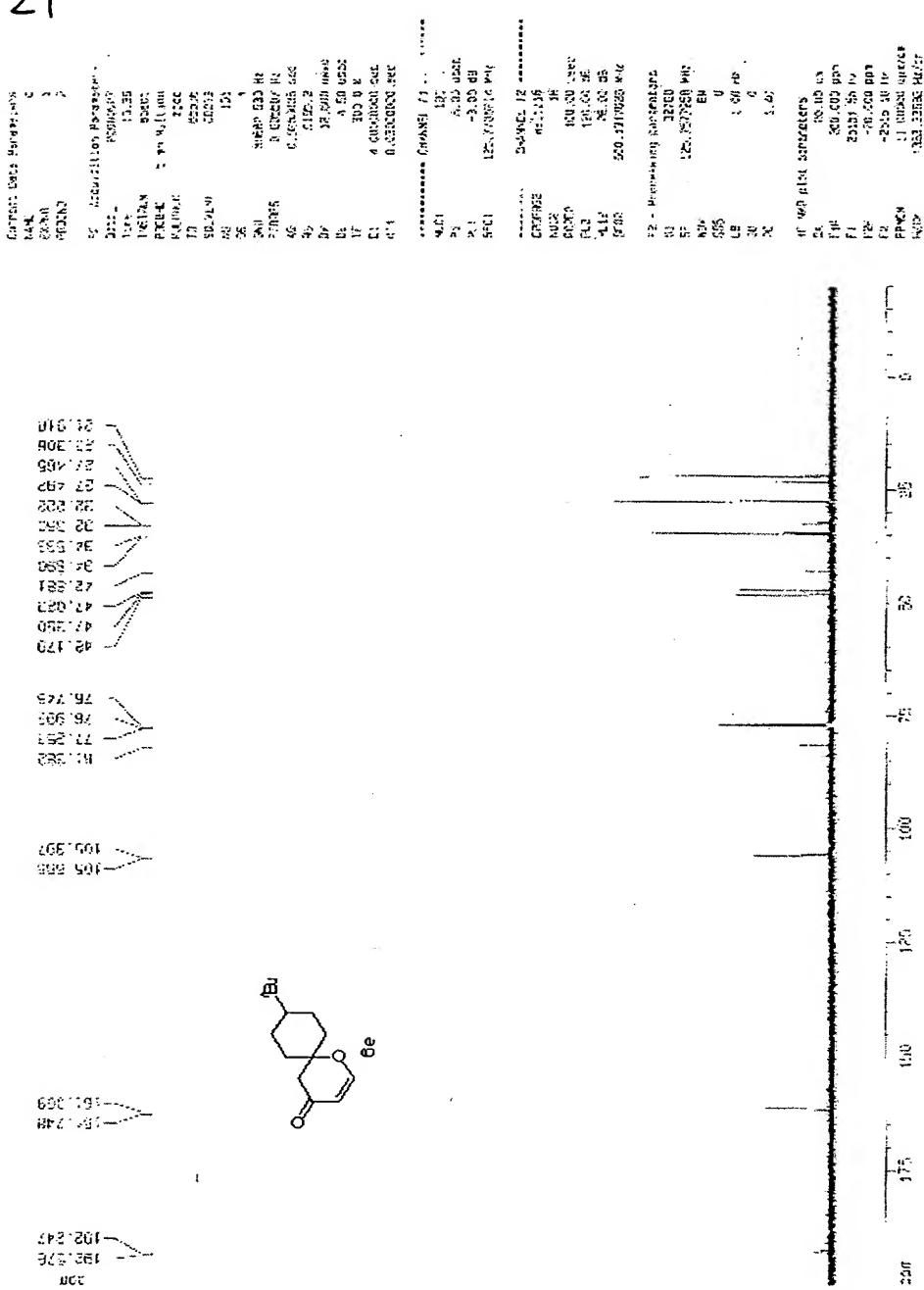


FIG. 22

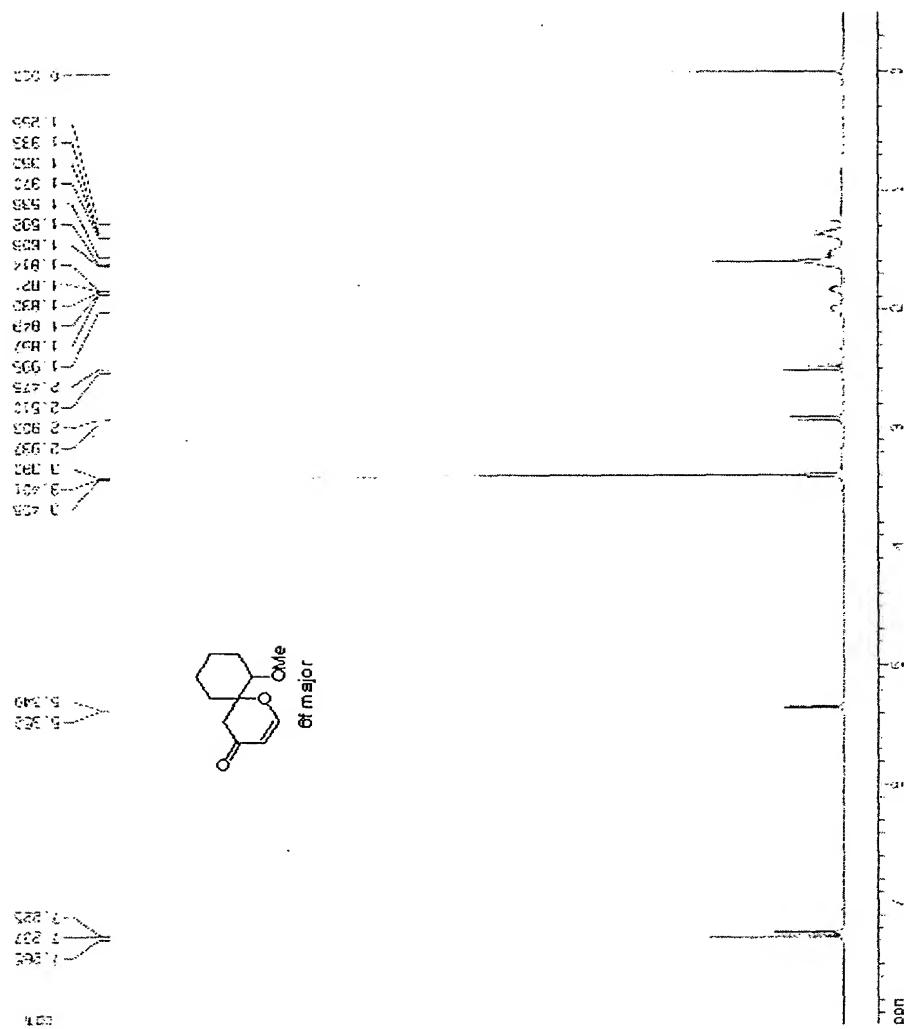
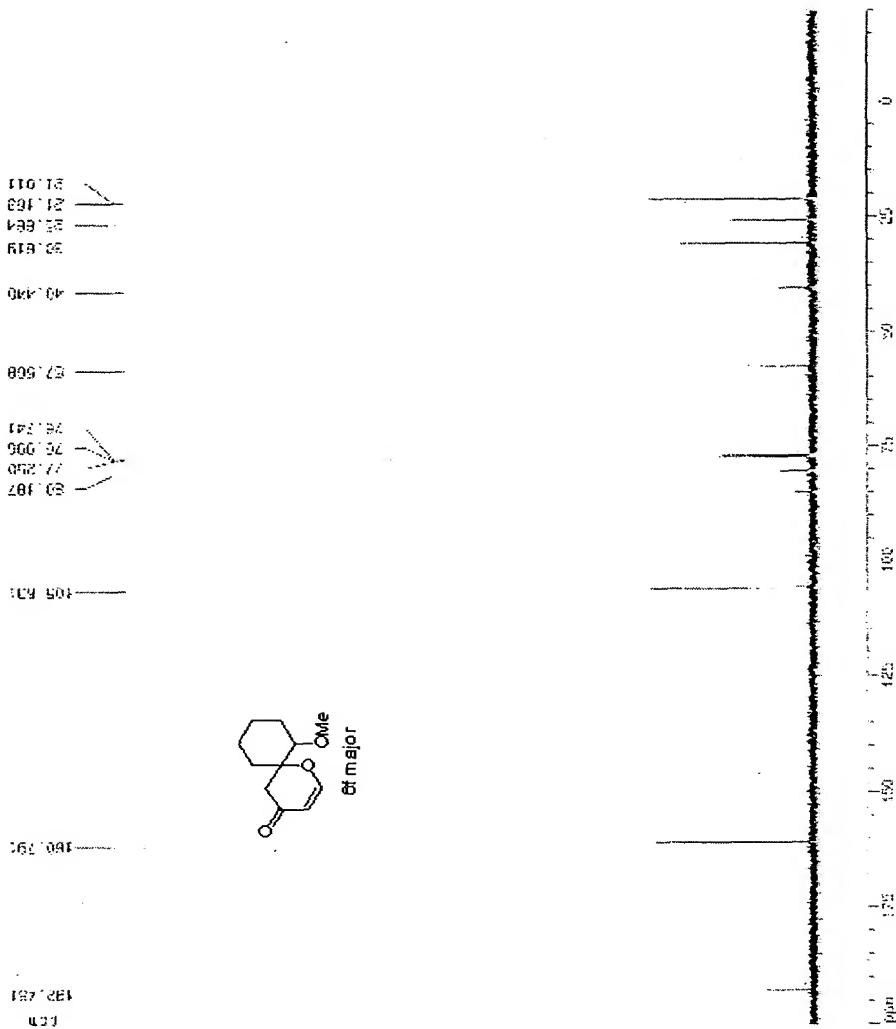


FIG. 23



Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and Methods of Performing Asymmetric Catalytic Reactions
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 24

FIG. 25

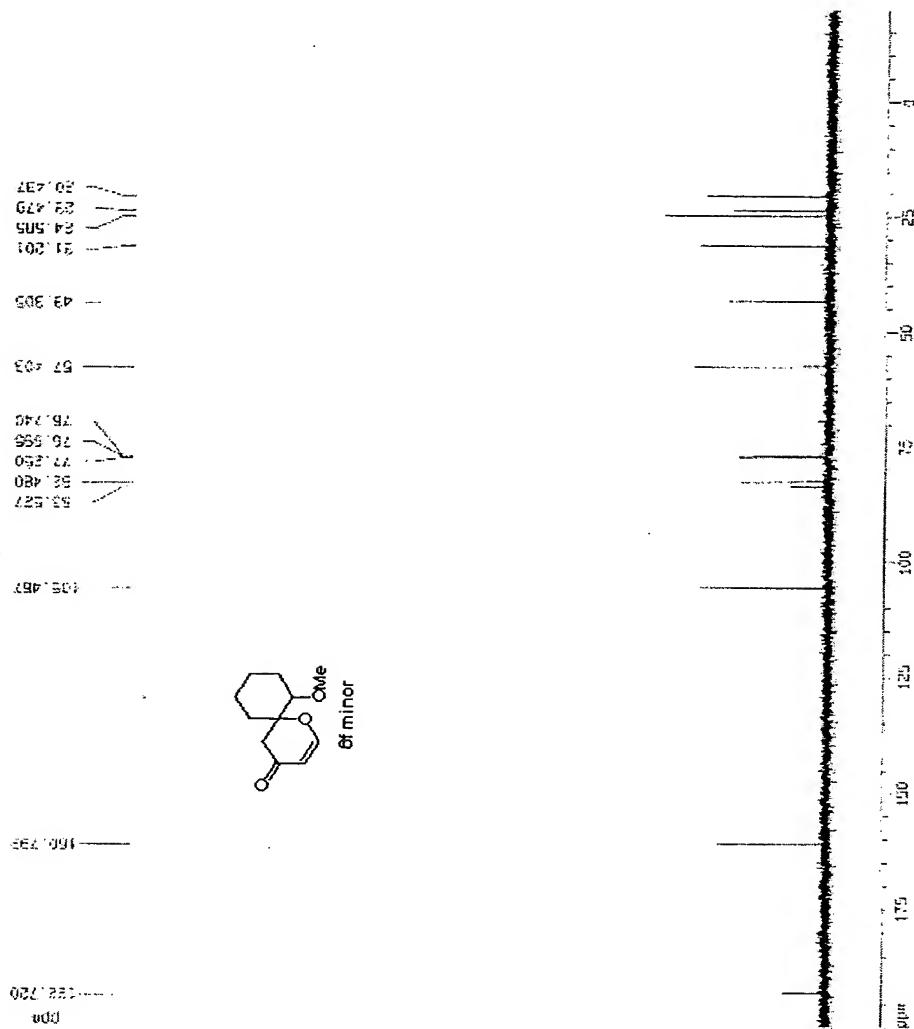


FIG. 26

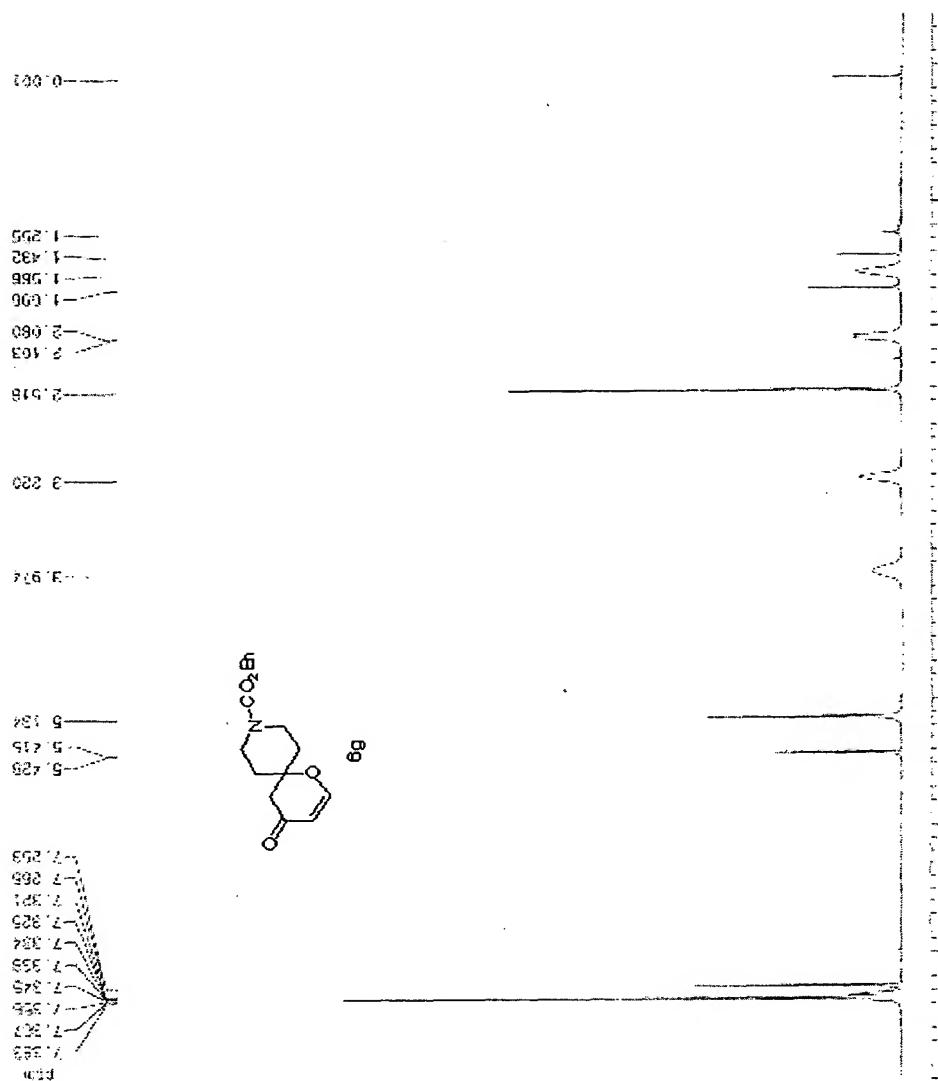


FIG. 27

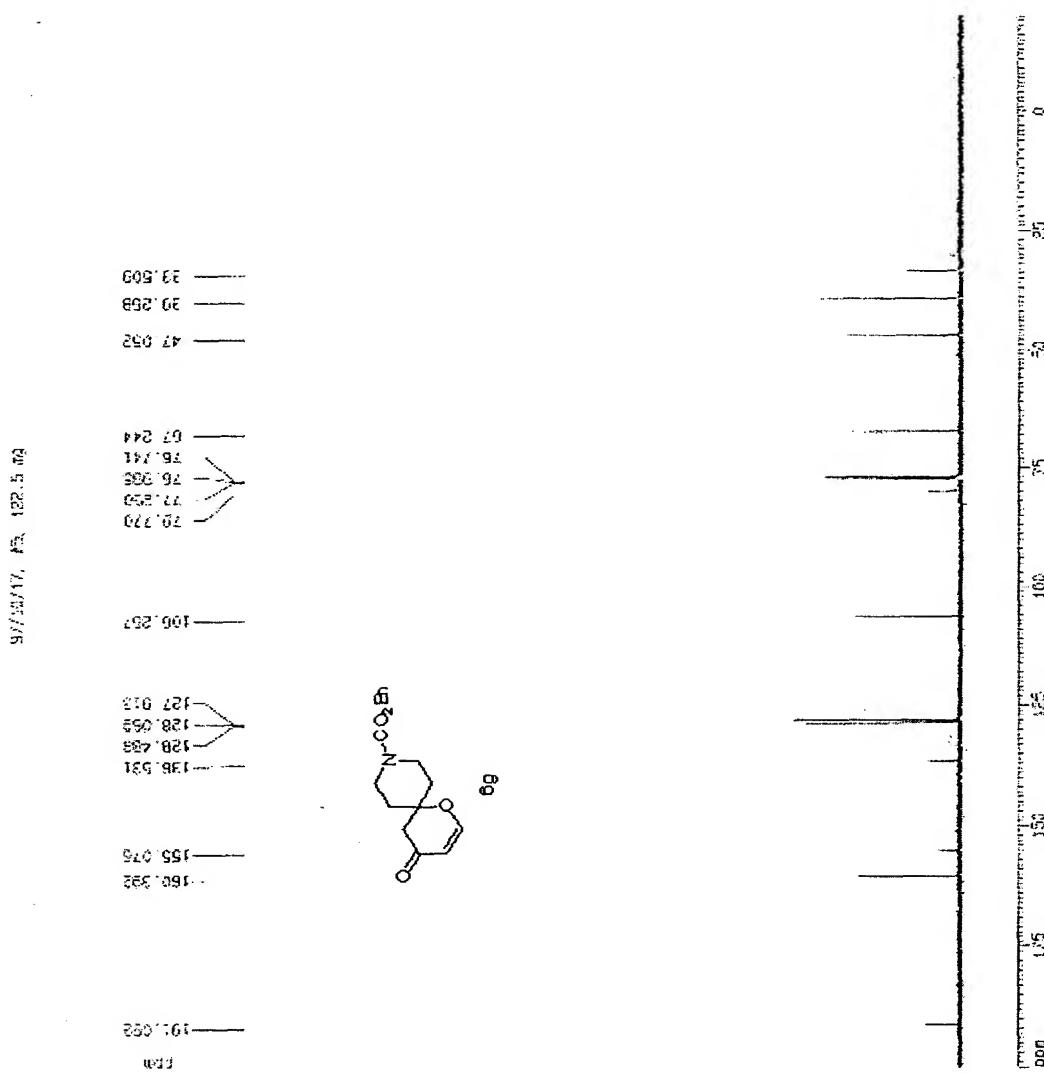


FIG. 28

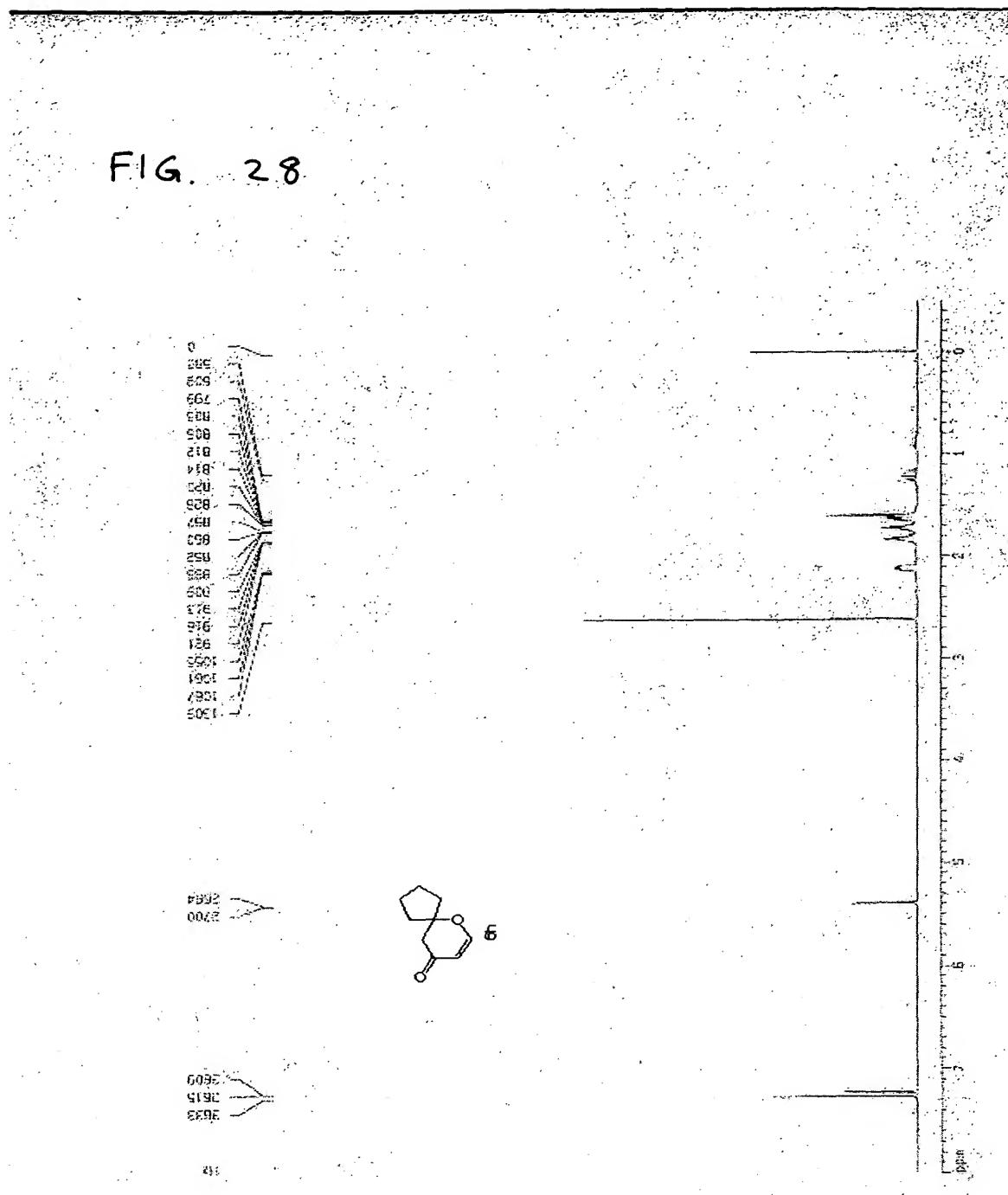


FIG. 29

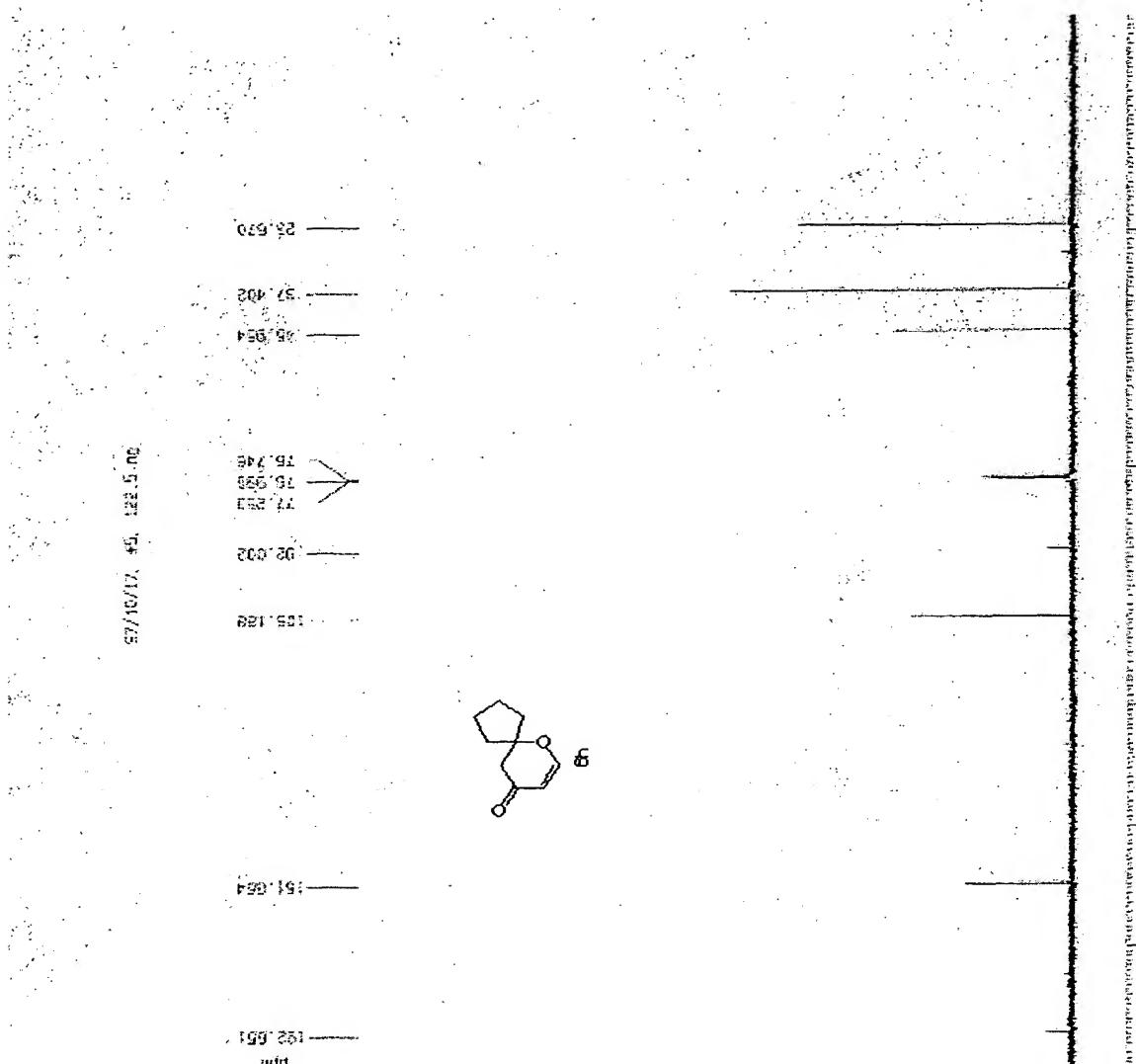
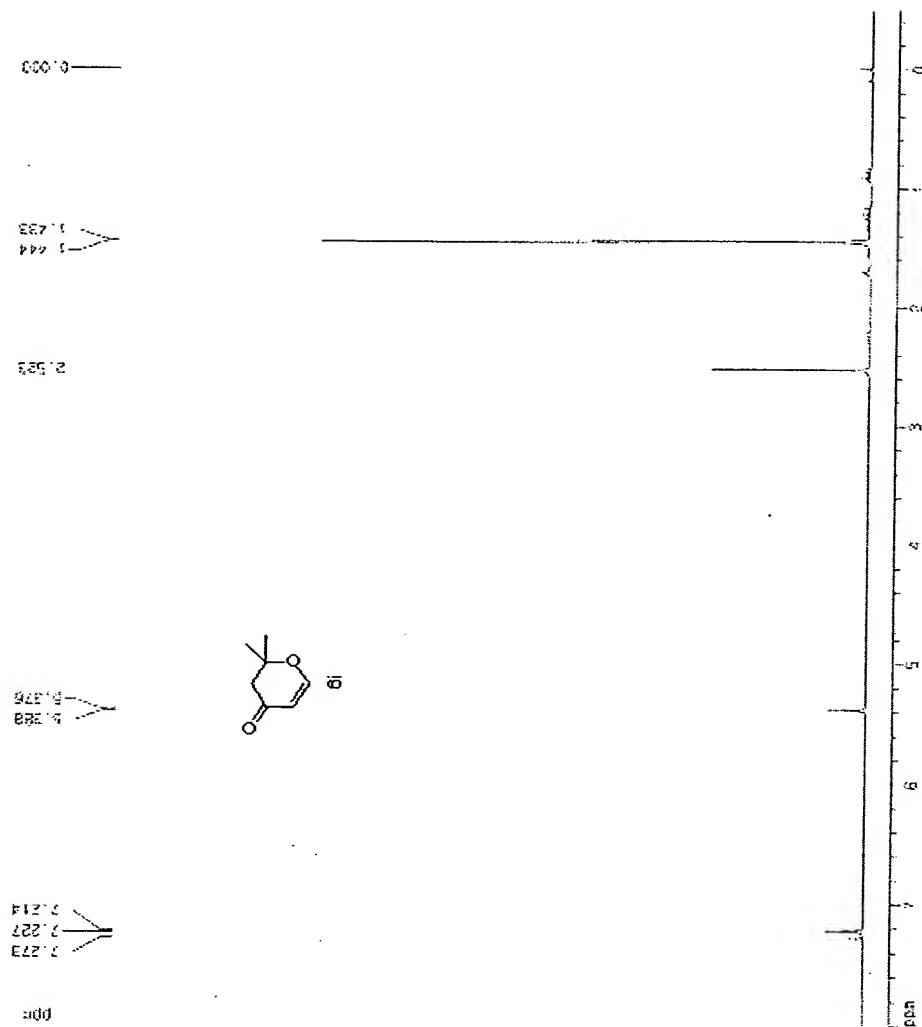


FIG. 30



**Patent Application for: Methods of Performing Cycloadditions, Reaction Mixtures, and
Methods of Performing Asymmetric Catalytic Reactions**
Inventors: Viresh H. Rawal, Yong Huang, Aditya K. Unni, and Avinash N. Thadani
7814/86

FIG. 31

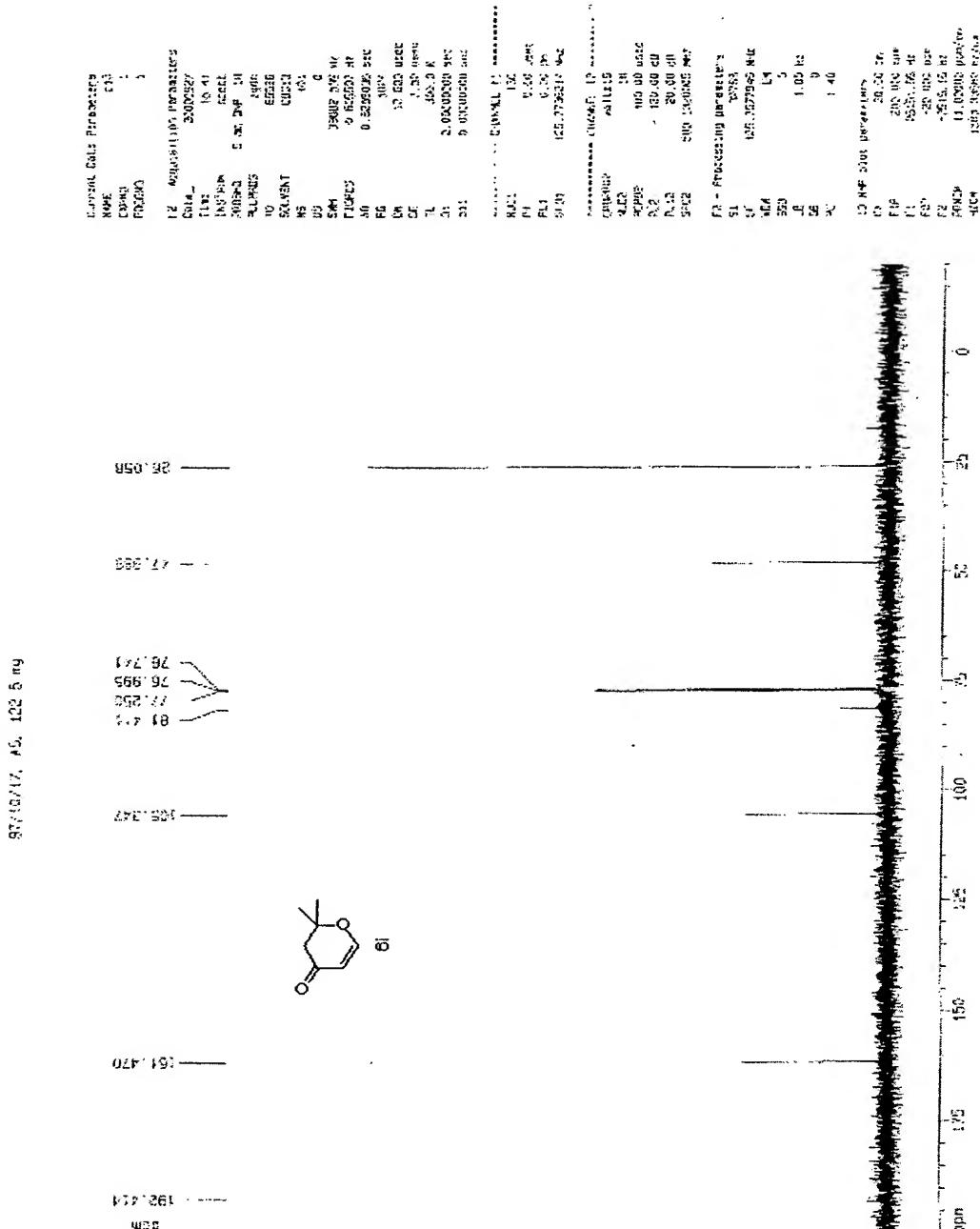


FIG. 32

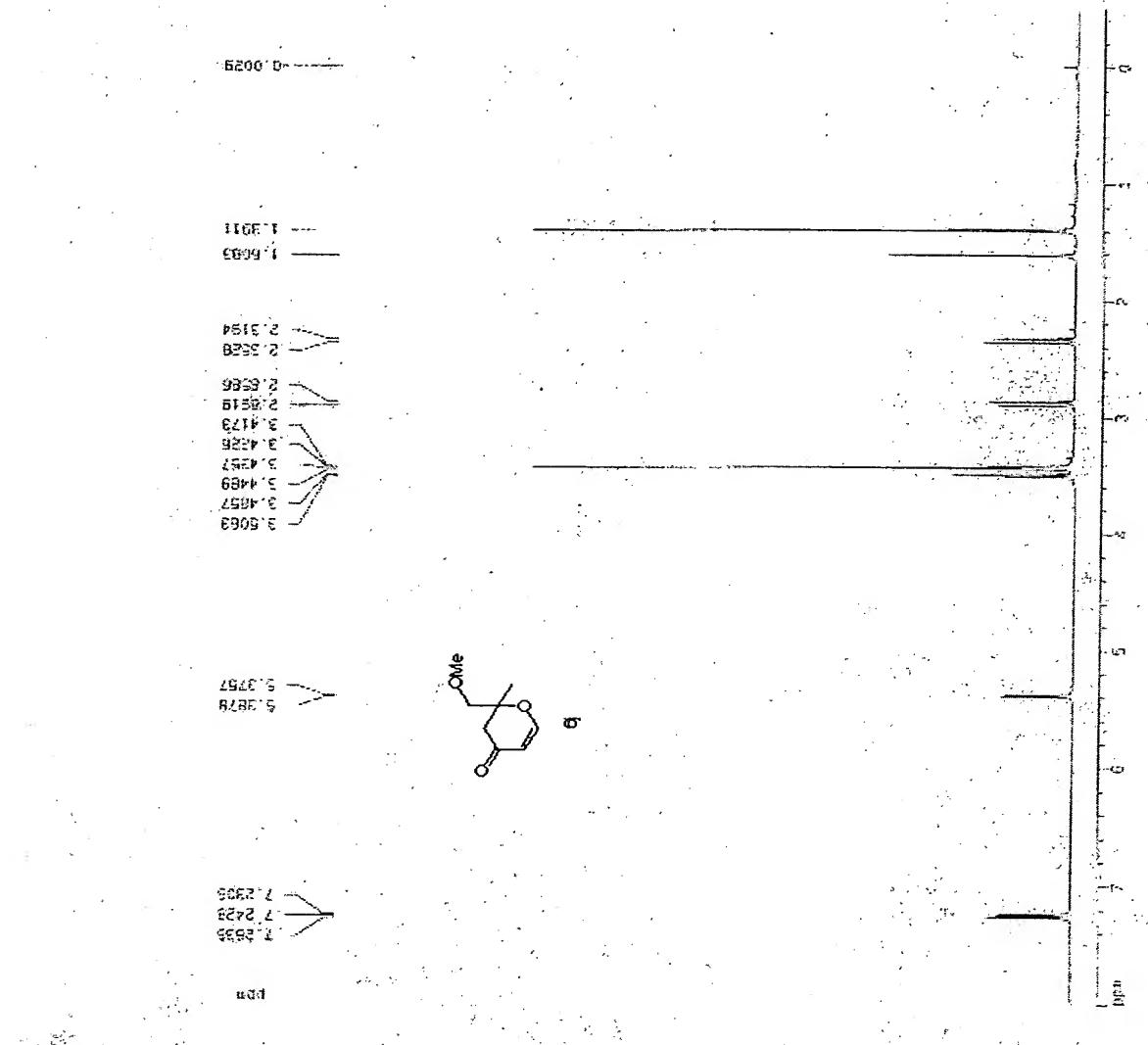


FIG. 33.

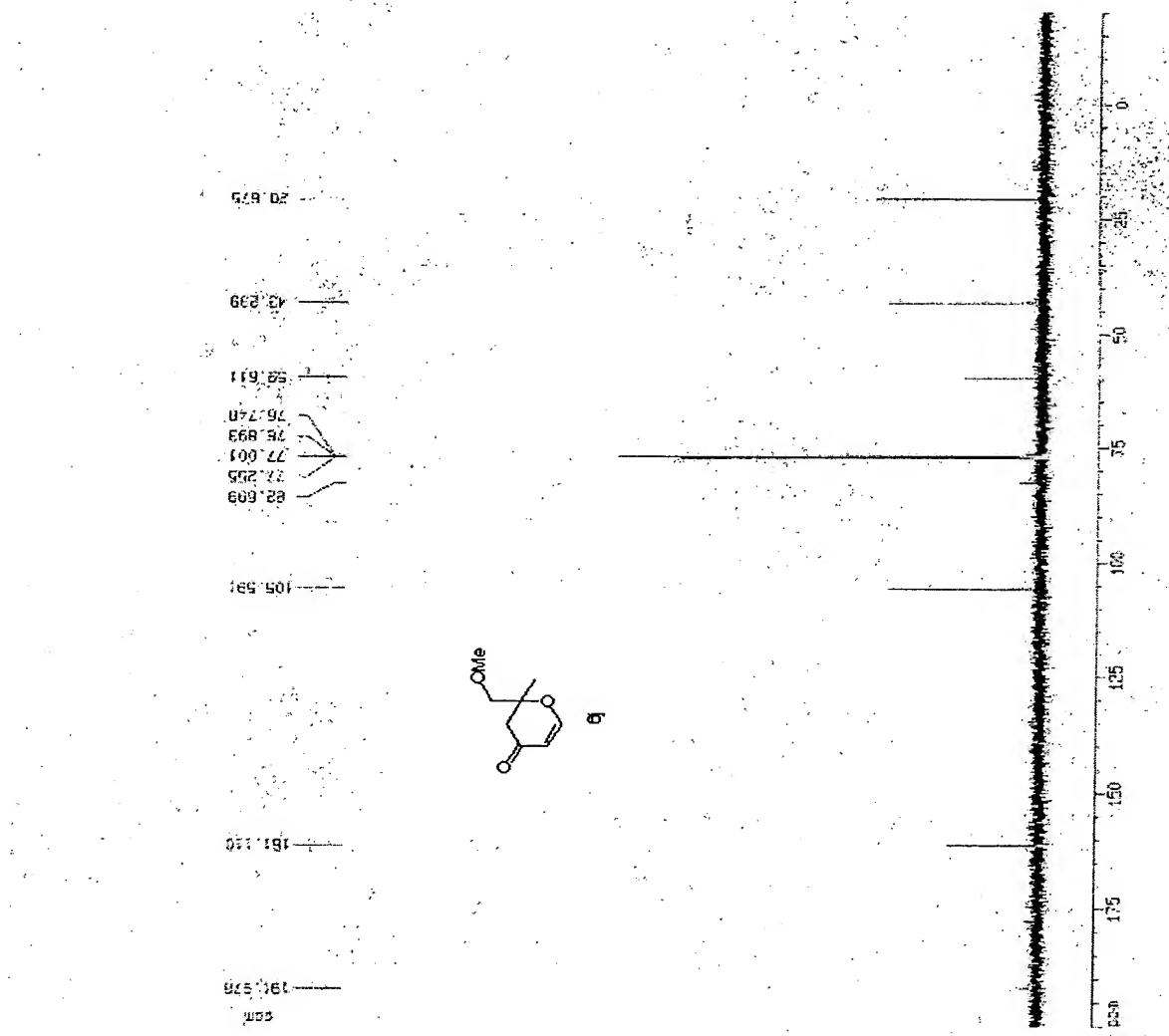


FIG. 34

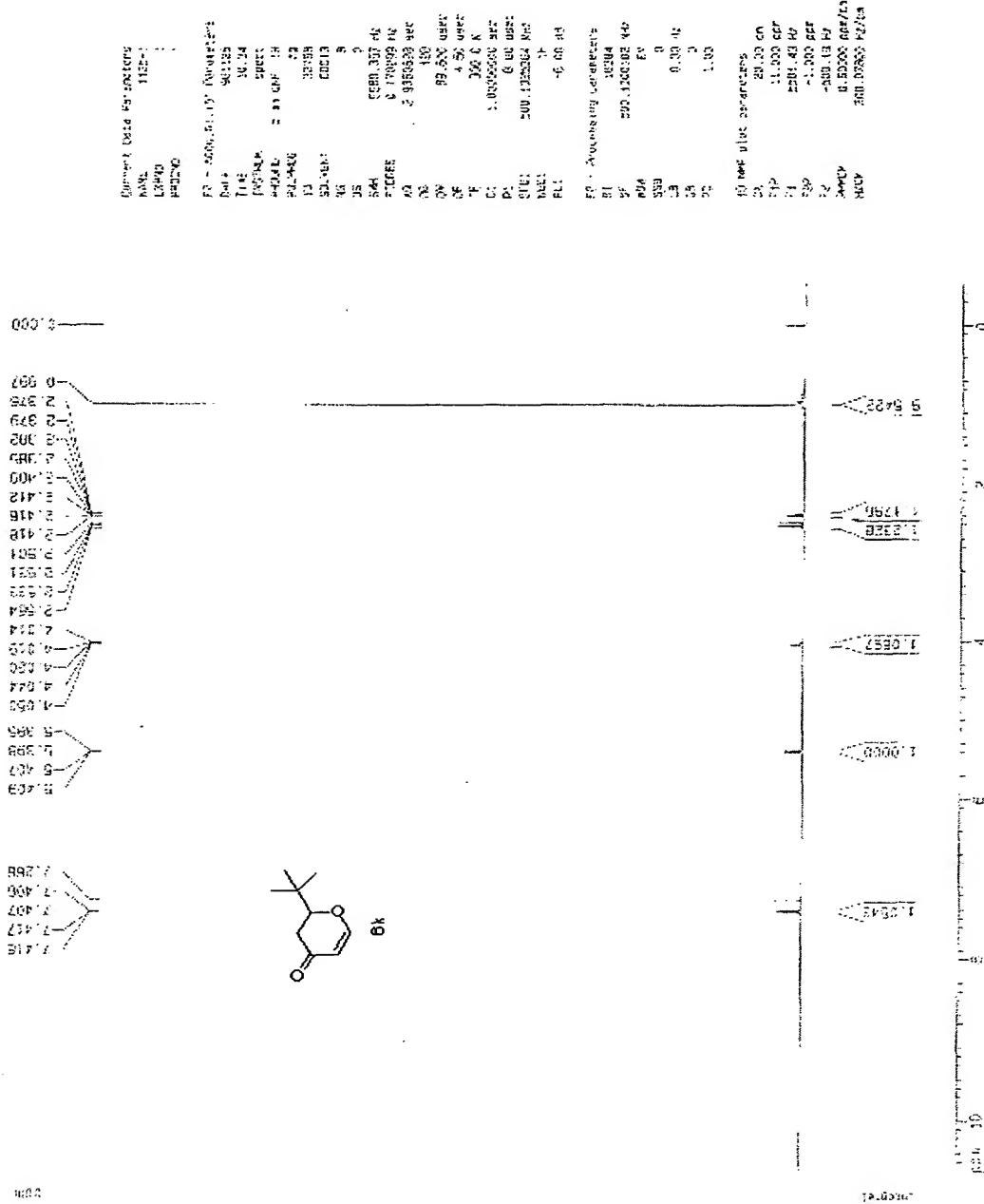


FIG. 35

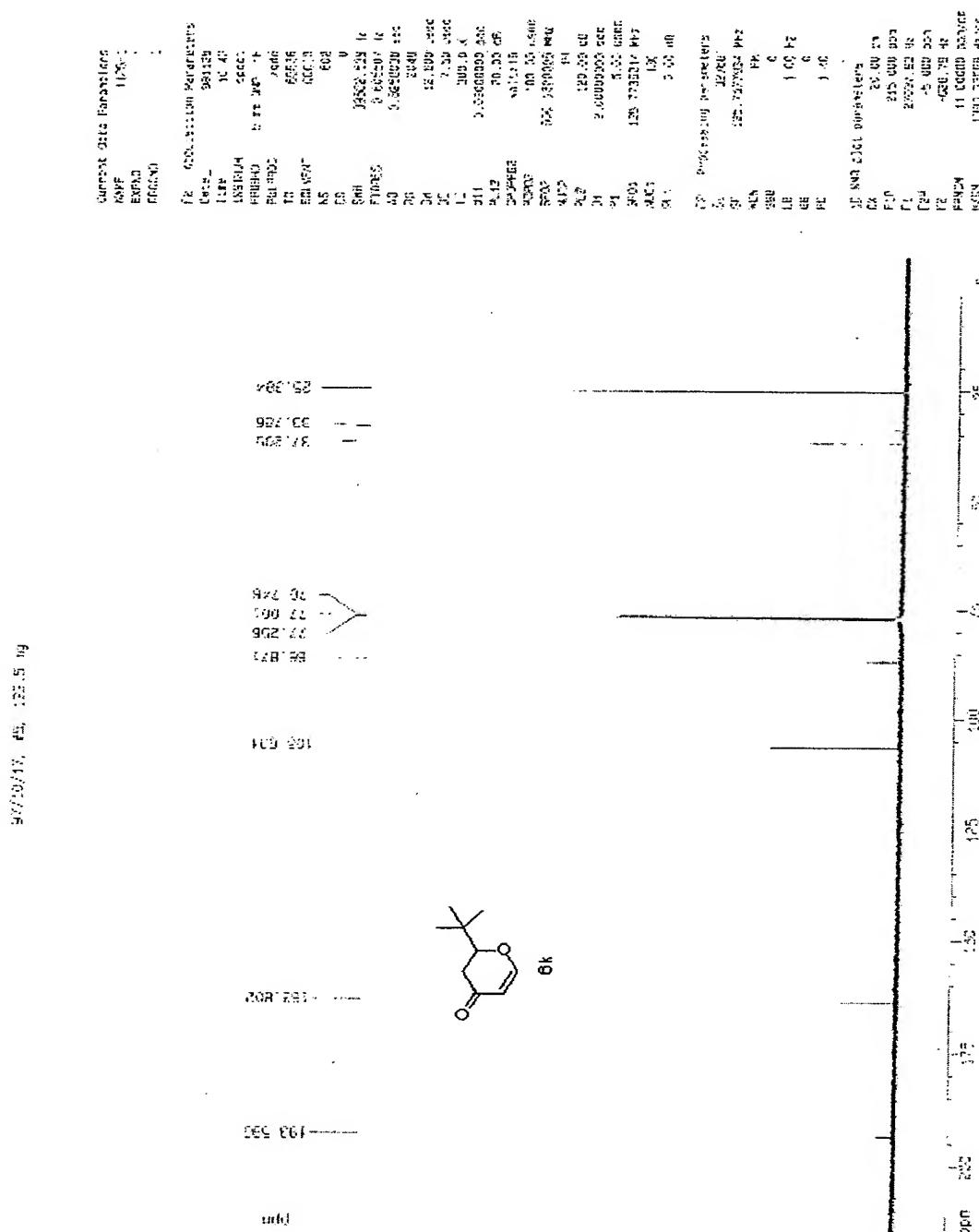
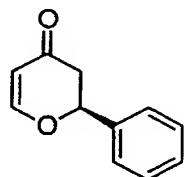


FIG. 36

Sample: AKU.II.175A
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.9 mL/min

Method: 0.9mL/Min.
Sampling Int: 0.1 Seconds

Data:



4a

[Chiralcel OD-H, hexane:*i*-propanol = 9:1, 0.9 mL/min]

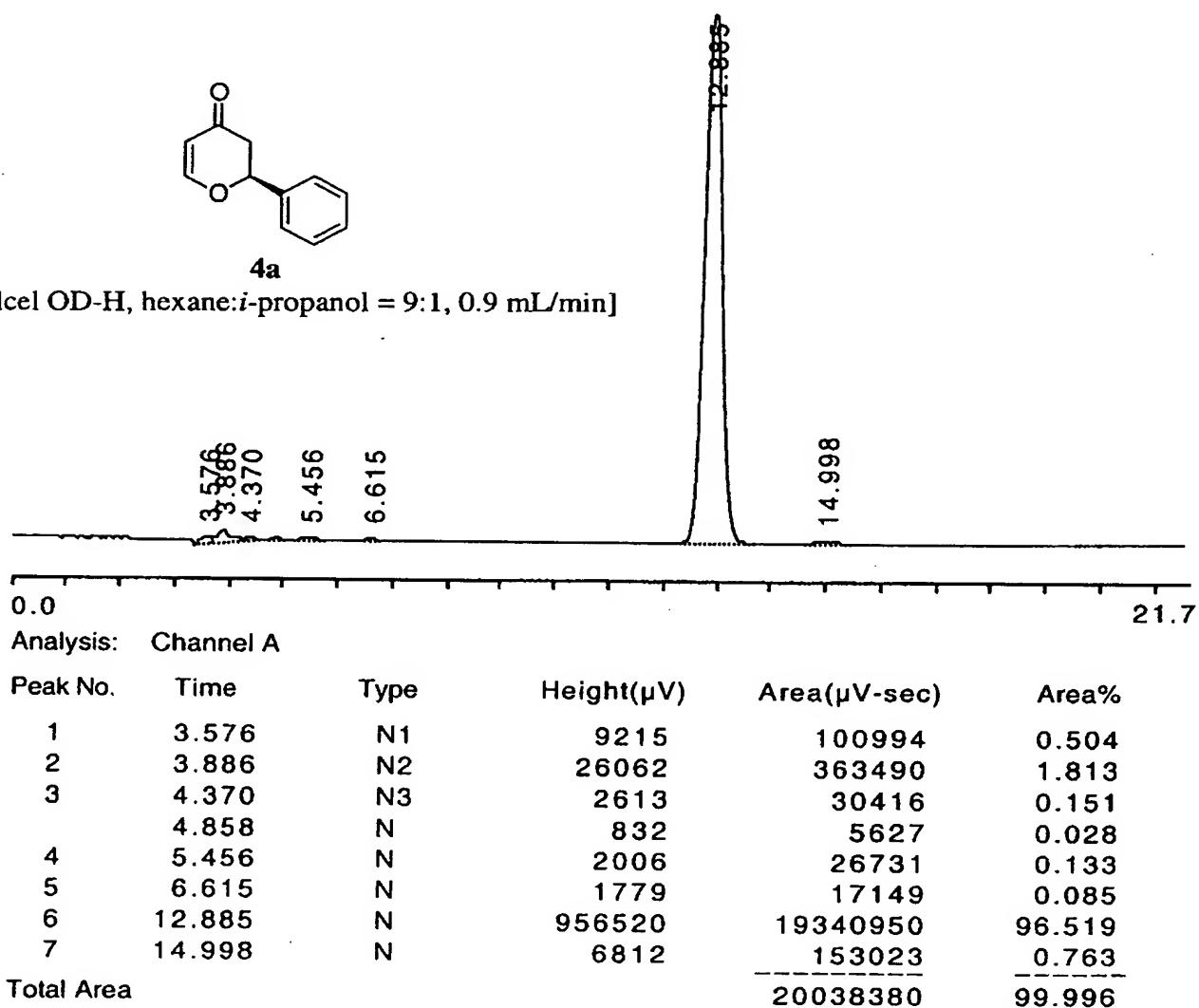


FIG. 37

Sample: AKU.II.145A
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.9 mL/min

Method: 0.9mL/Min.
Sampling Int: 0.1 Seconds

Data:

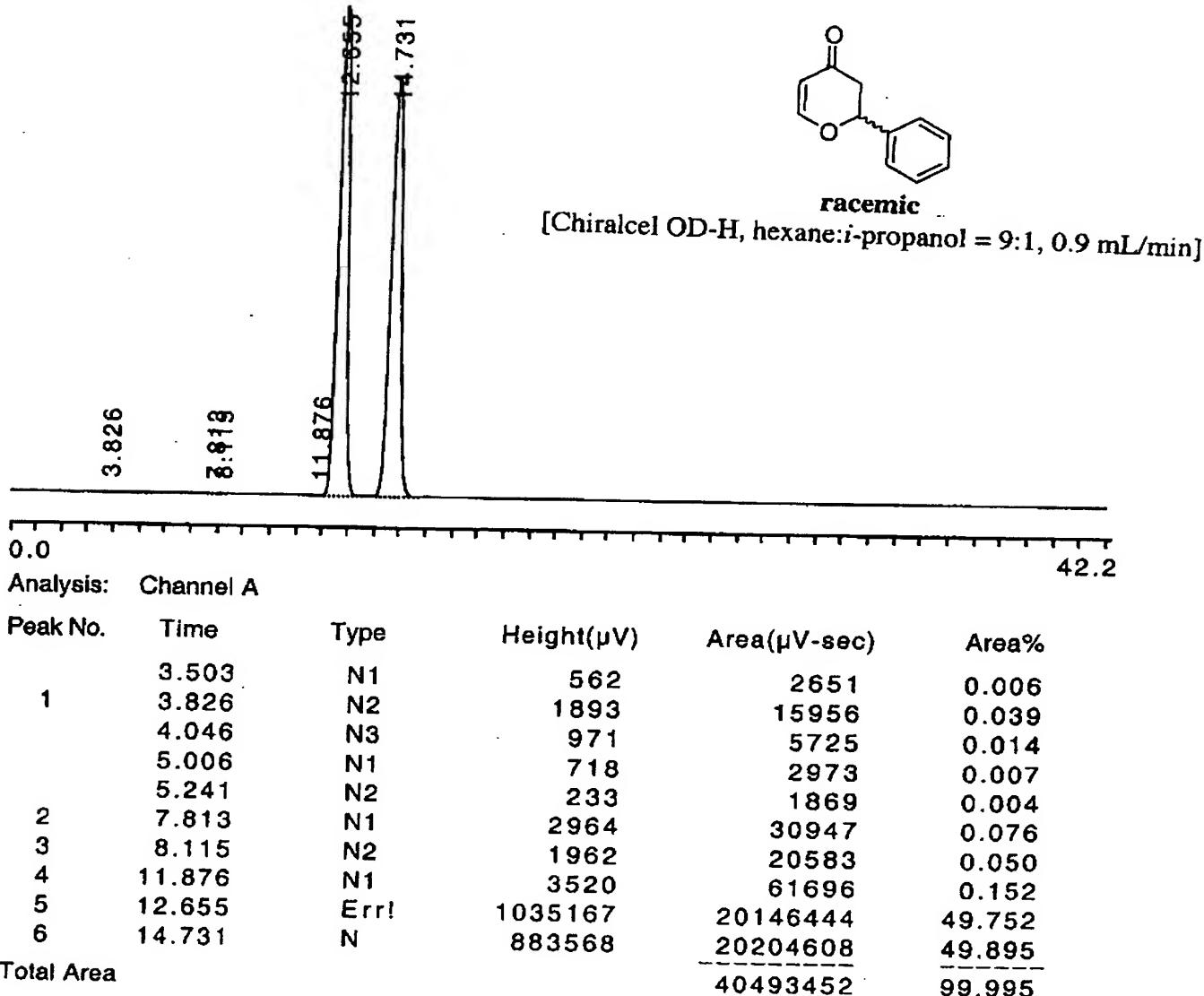


FIG. 38

Sample: AKU.II.227A
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.5 mL/min

Method: 0.5mL/Min.

Sampling Int: 0.1 Seconds

Data:

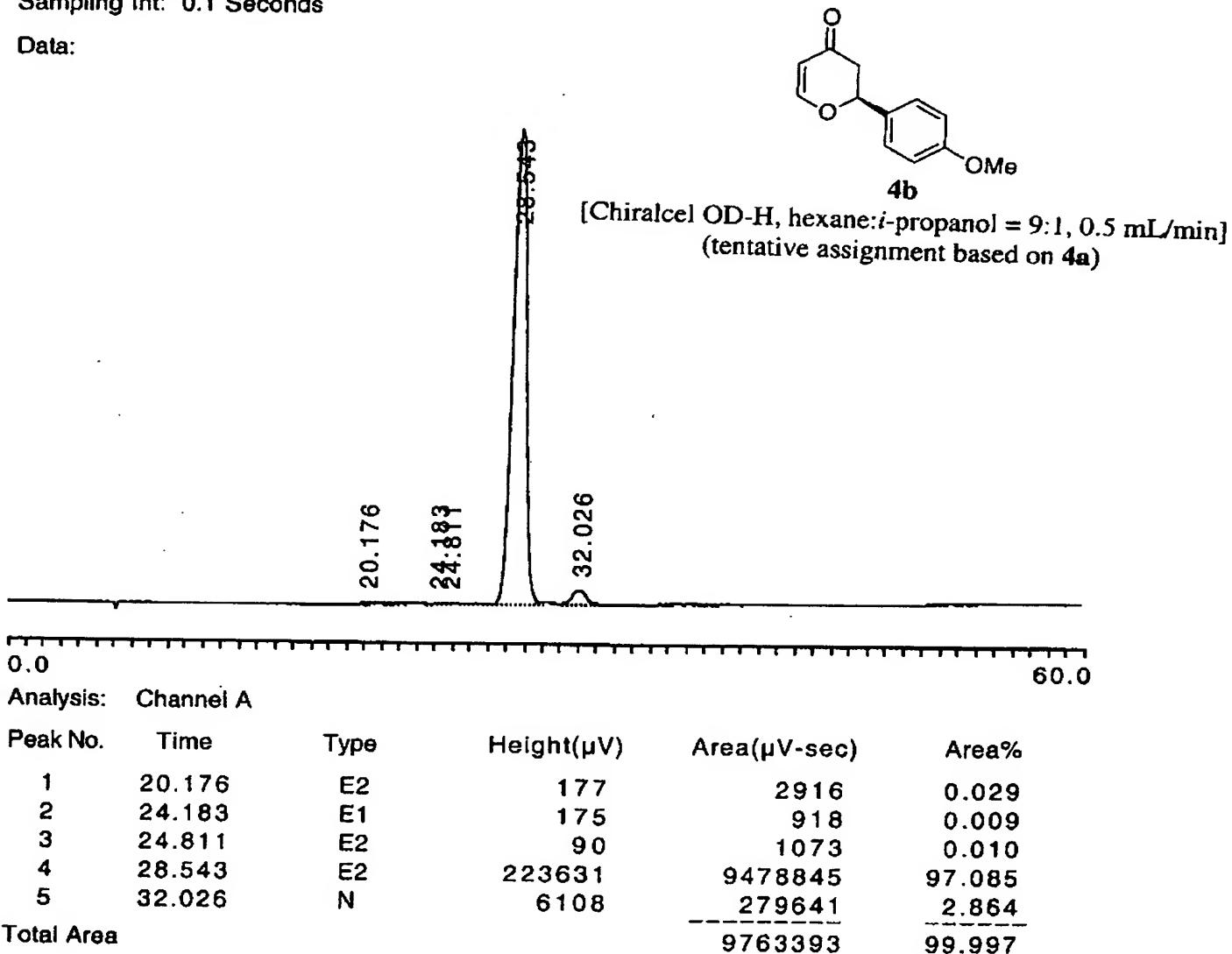
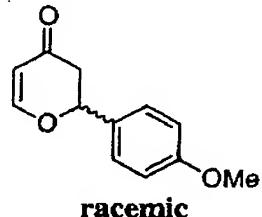


FIG. 39

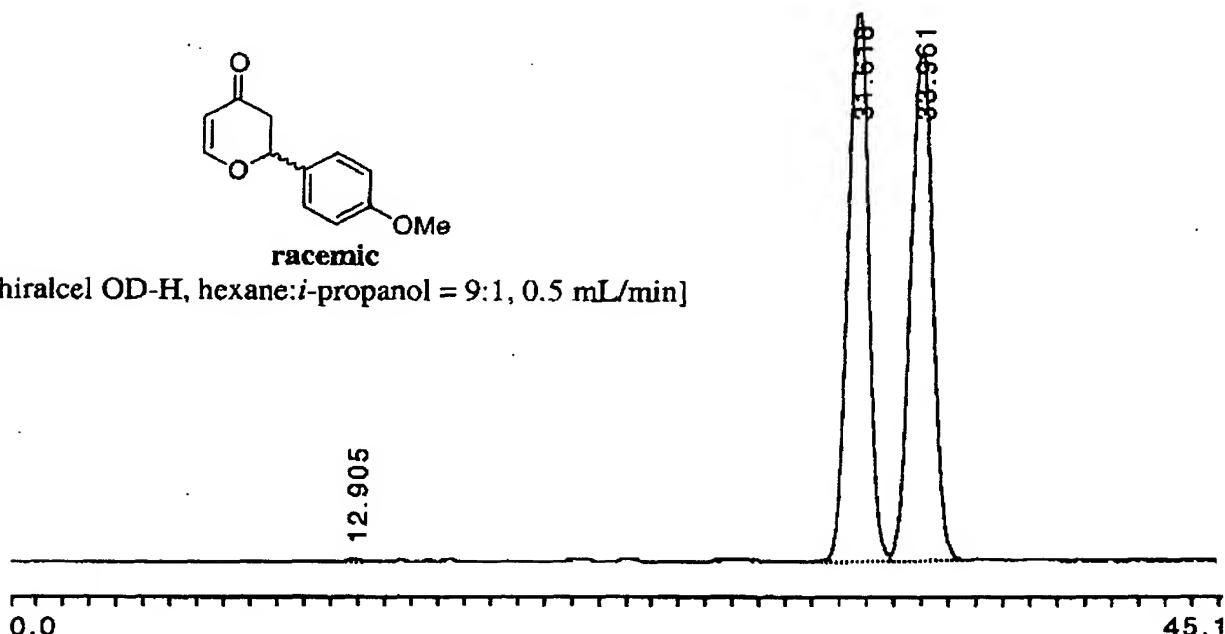
Sample: AKU.II.145B
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0. 5 mL/min

Method: 0.5mL/Min.
Sampling Int: 0.1 Seconds

Data:



[Chiracel OD-H, hexane:*i*-propanol = 9:1, 0.5 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	12.905	N	1970	30188	0.026
2	31.618	Err!	1197506	56719898	49.888
3	33.961	Err!	1110108	56943876	50.085
Total Area				113693962	99.999

FIG. 40

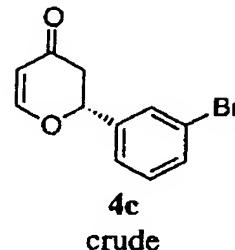
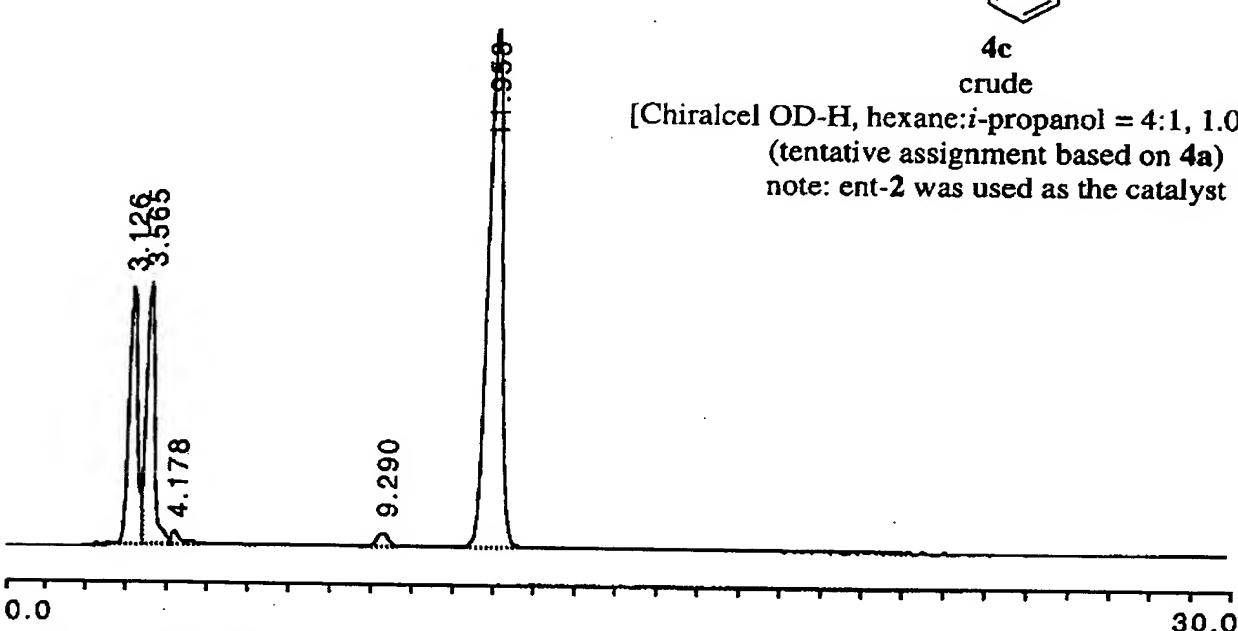
Sample:

pyran-3-bromophenyl
 OD-H
 20% i-PrOH/Hexane, 1.0 mL/min

Processing File:

Method: general condition-30min
 Sampling Int: 0.1 Seconds

Data:



[Chiralcel OD-H, hexane:i-propanol = 4:1, 1.0 mL/min]
 (tentative assignment based on 4a)
 note: ent-2 was used as the catalyst

Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	2.245	Errl	1147	633	0.005
	2.645	Errl	543	2336	0.020
	3.126	N1	174081	1923918	16.718
	3.565	N2	176533	2034916	17.683
	4.178	Errl	7530	88623	0.770
	4.555	Errl	1062	7197	0.062
	6.066	Errl	401	1315	0.011
	8.678	Errl	385	135	0.001
	8.776	Errl	243	191	0.001
4	9.290	Errl	8197	130505	1.134
	11.958	N	350239	7317384	63.586
5	17.498	Errl	257	551	0.004
	Total Area			11507704	99.995

FIG. 41

Sample:

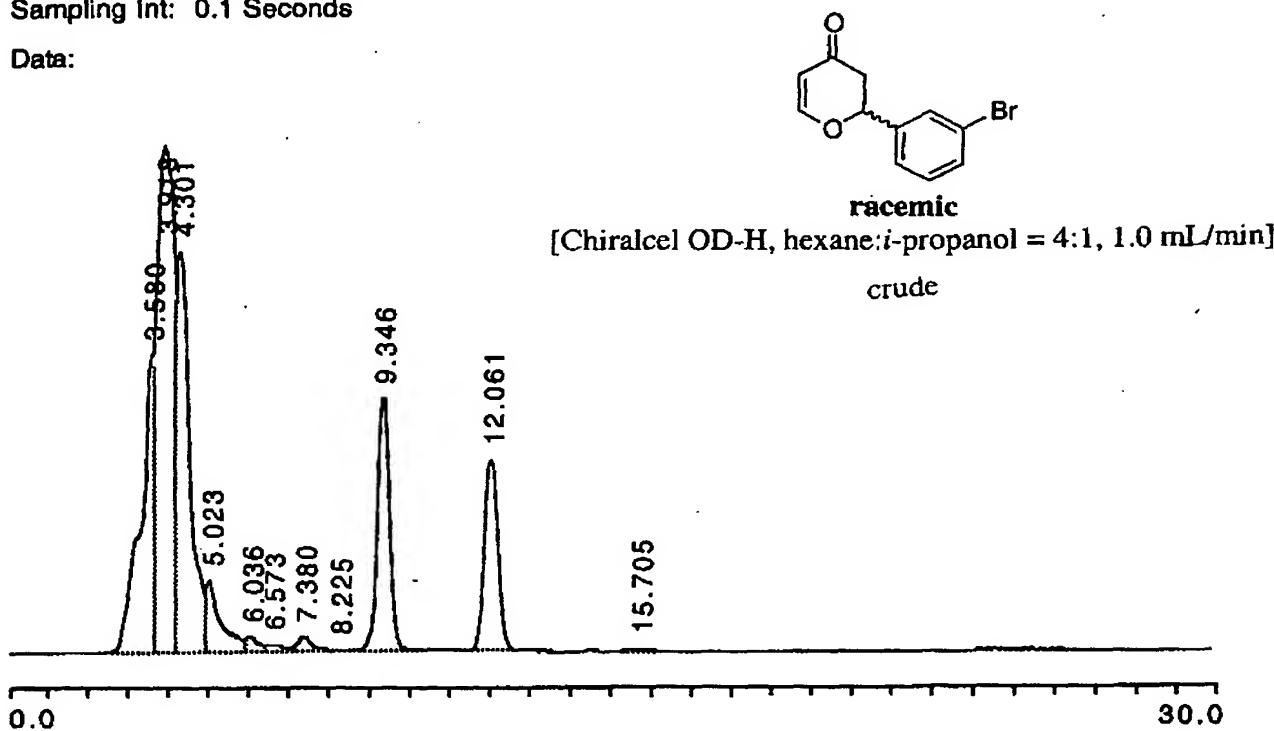
pyran-3-bromophenyl
OD-H
20% i-PrOH/Hexane, 1.0 mL/min

Processing File:

Method: general condition-30min

Sampling Int: 0.1 Seconds

Data:



Analysis: Channel A

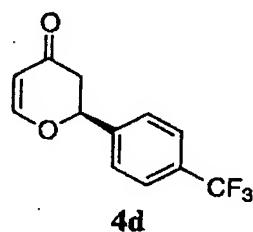
Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	3.580	N1	929950	18672350	15.123
2	3.918	Errl	1578446	44994432	36.443
3	4.301	Errl	1251011	26245272	21.257
4	5.023	N4	221661	5347249	4.330
5	6.036	N5	40524	835084	0.876
6	6.573	Errl	18597	557508	0.451
7	7.380	N7	40756	792924	0.642
8	8.225	Errl	2766	48066	0.038
9	9.346	N	790975	13368844	10.828
10	12.061	N	602050	12510882	10.133

FIG. 42

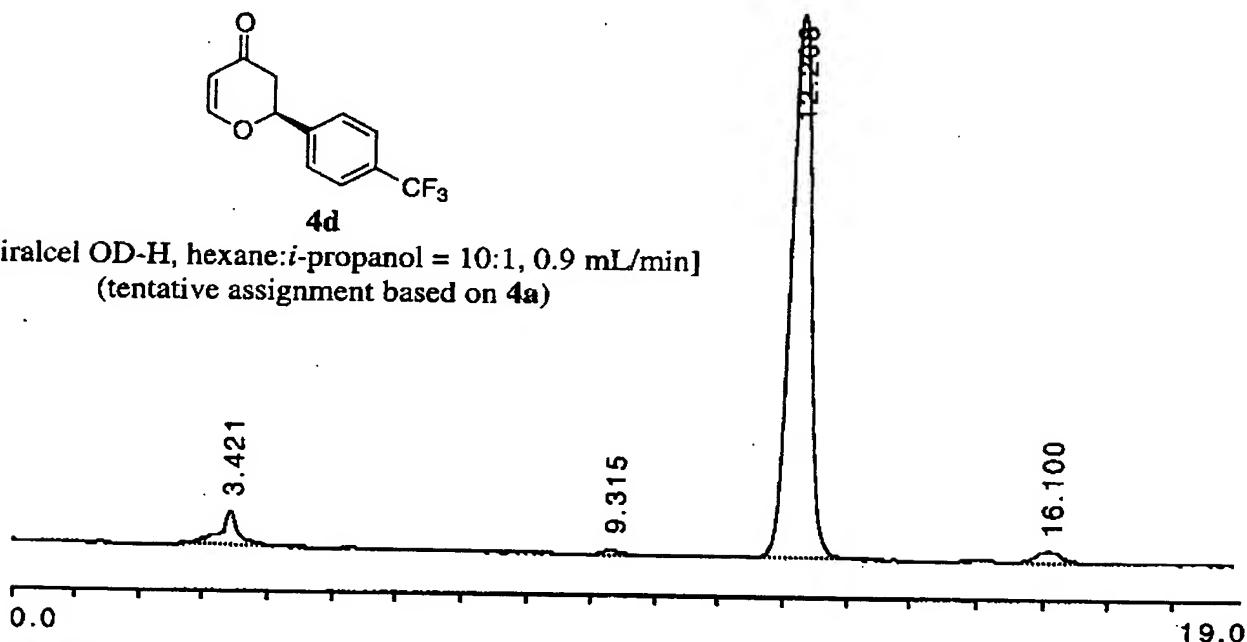
Data: AT.4-CF3.20mol%.L.-78.48h.0.9

Method: 0.9mL/Min.
Sampling Int: 0.1 Seconds

Data:



[Chiralcel OD-H, hexane:*i*-propanol = 10:1, 0.9 mL/min]
(tentative assignment based on 4a)



Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	3.421	N	16523	279041	5.146
2	9.315	N	1831	23937	0.441
3	12.208	N	254842	4991673	92.064
4	16.100	N	5165	127294	2.347
Total Area				5421945	99.998

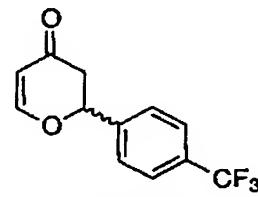
FIG. 43

Data: AKU.II.145C 4-F3C rac

Sample: AKU.II.145C
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.9 mL/min

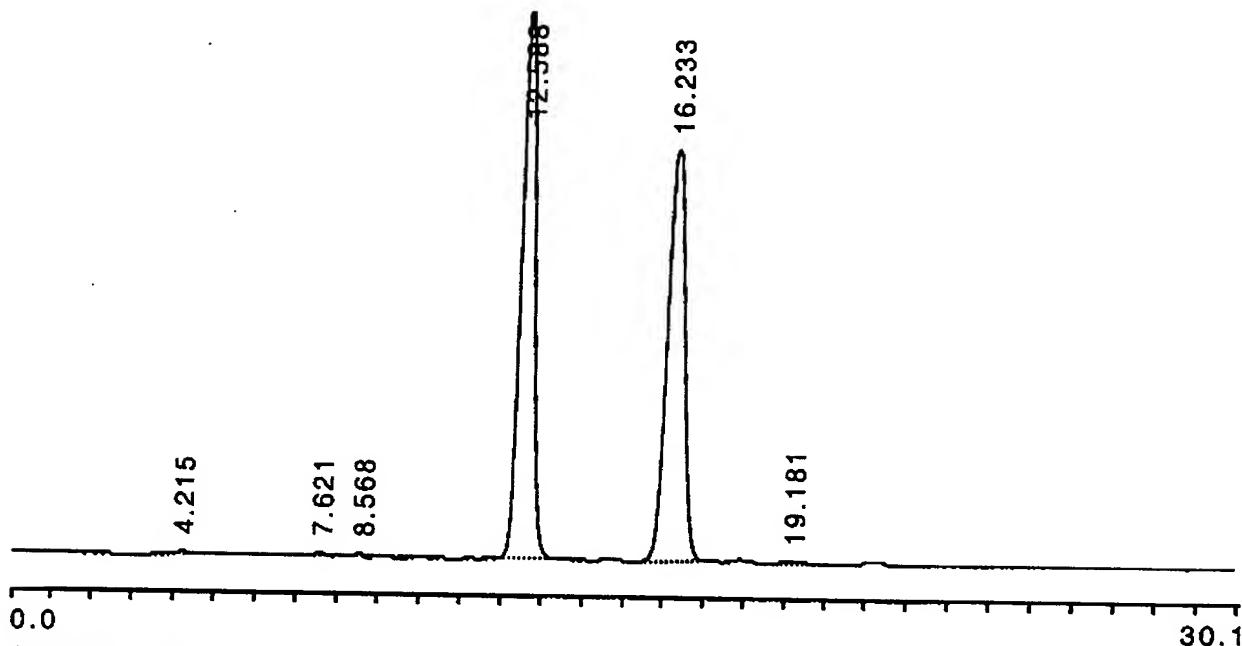
Method: 0.9mL/Min.
Sampling Int: 0.1 Seconds

Data:



racemic

[Chiracel OD-H, hexane:i-propanol = 9:1, 0.9 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(µV)	Area(µV-sec)	Area%
1	3.901	N	452	2495	0.010
	4.215	N1	2600	20244	0.088
	4.436	N2	1156	8533	0.037
	5.408	N	921	6206	0.027
2	7.621	N	3893	40499	0.177
3	8.568	N	2653	25293	0.110
4	12.588	N	585042	11355290	49.815
5	16.233	N	440367	11268832	49.436
6	19.181	N	2648	67138	0.294
	28.736	N	159	191	0.000
Total Area				22794721	99.994

FIG. 44

Data: AT.1-naph.L.-78.48h(5%,1.4mL)

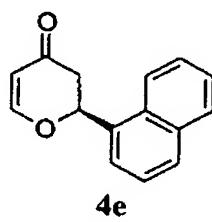
Sample: AT
1-naphthaldehyde, -78C, 48 h
OD-H, 5% iPrOH/hexanes, 1.4 mL/min

Processing File: aku1

Method: 1.4mL/Min.

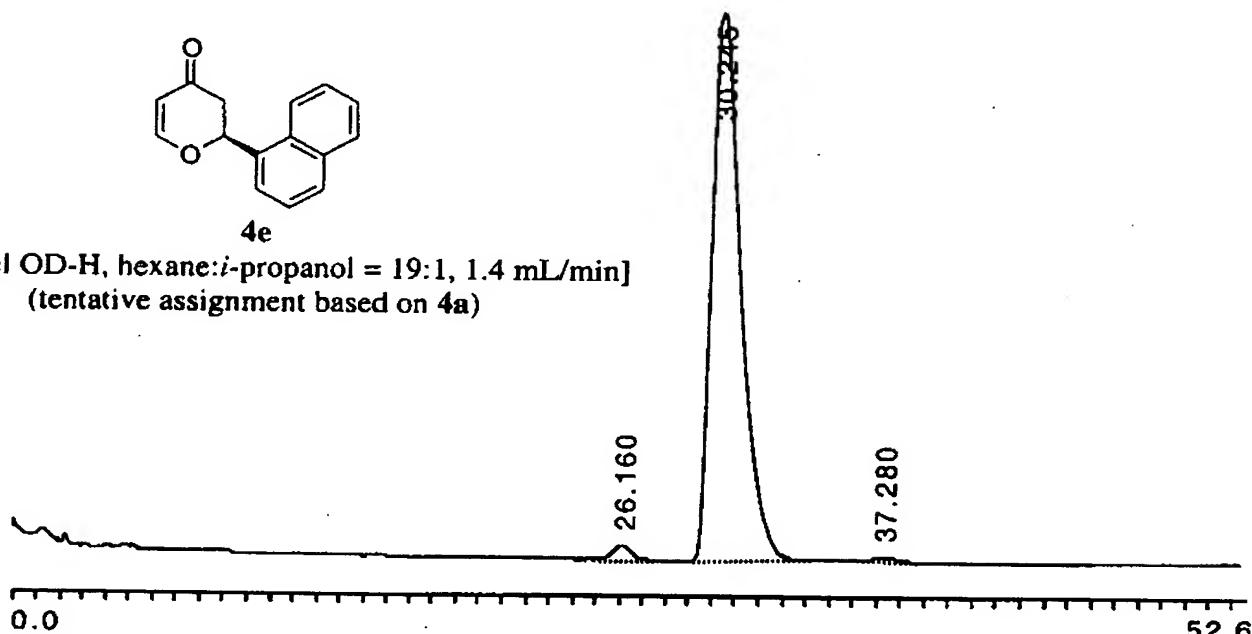
Sampling Int: 0.1 Seconds

Data:



4e

[Chiralcel OD-H, hexane:*i*-propanol = 19:1, 1.4 mL/min]
(tentative assignment based on 4a)



Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	26.160	N	29209	1383795	1.510
2	30.245	Err!	1140658	89644942	97.850
3	37.280	N	8712	585517	0.639
Total Area				91614254	99.999

FIG. 45

Sample: AKU.II.145G
Chiracel OD-H, 25cm
5% i-PrOH/Hexane, 1.4 mL/min

Method: 1.4mL/Min.
Sampling Int: 0.1 Seconds

Data:

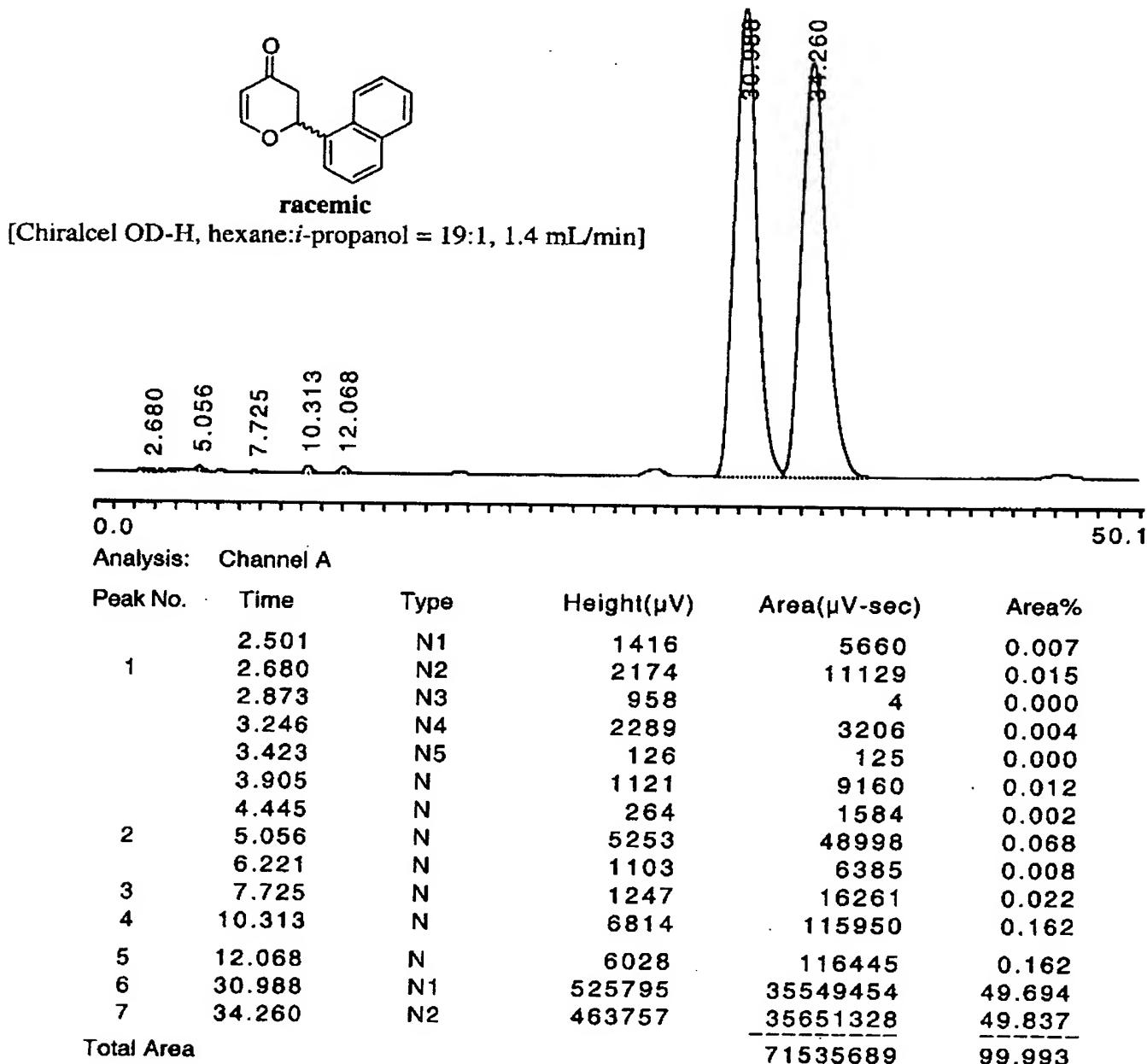


FIG. 46

Data: AKU.II.222A-2Naphthyl

Sample:

Method: 1.0ml/Min

Sampling Int: 0.1 Seconds

Data:

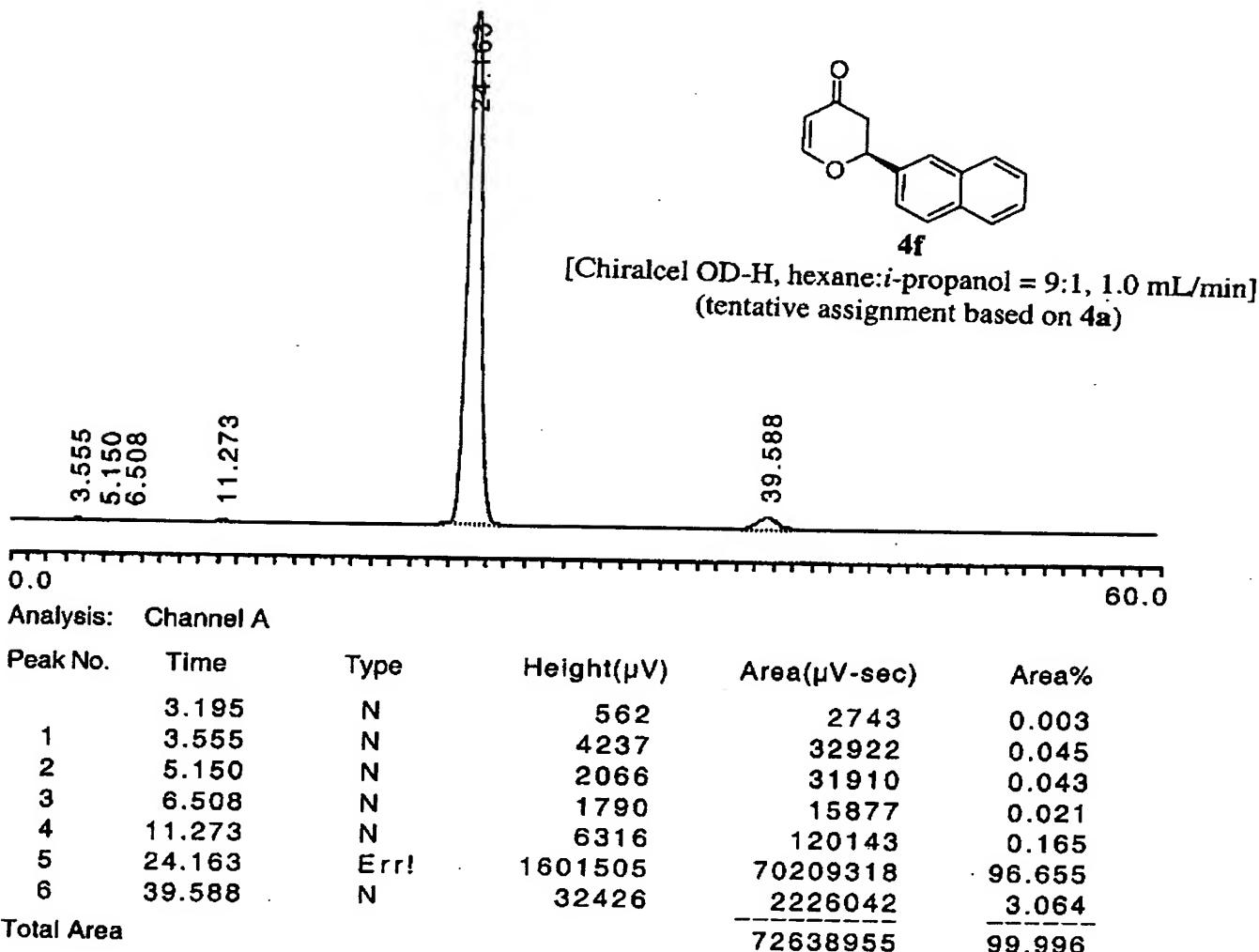


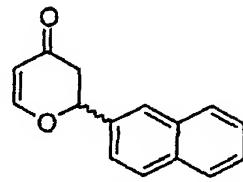
FIG. 47

Data: AKU.II.145H 2-nap rac

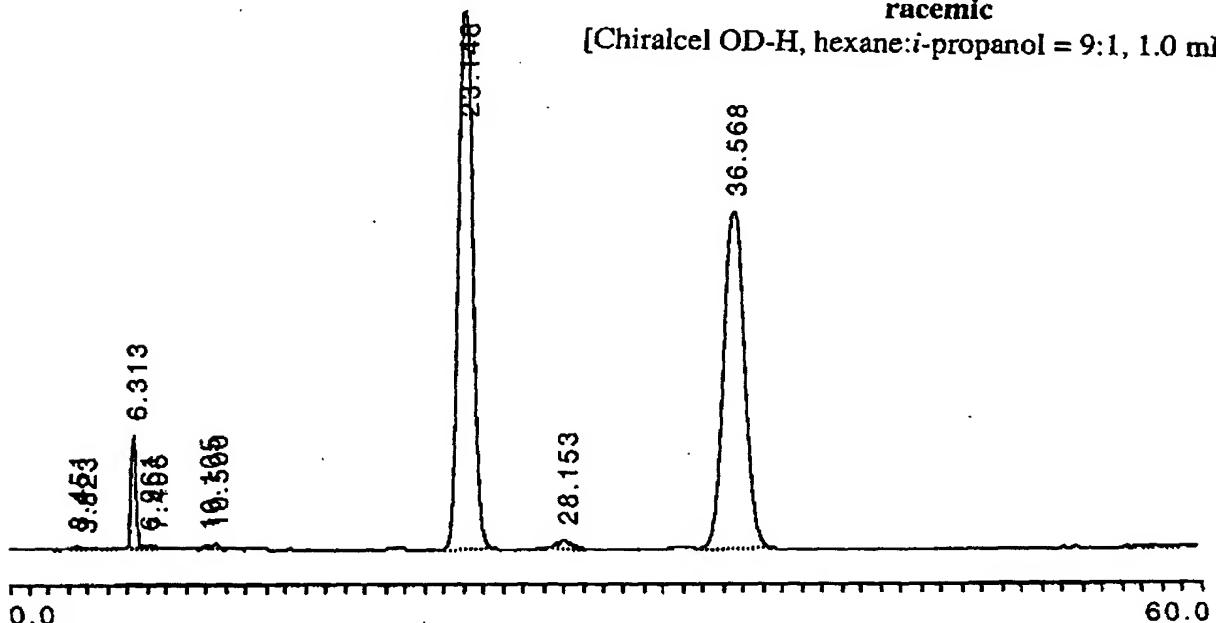
Sample: AKU.II.145H
 Chiracel OD-H, 25cm
 10% i-PrOH/Hexane, 1.0 mL/min

Method: 1.0mL/Min
 Sampling Int: 0.1 Seconds

Data:



[Chiracel OD-H, hexane:i-propanol = 9:1, 1.0 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(µV)	Area(µV-sec)	Area%
1	3.175	N1	734	4123	0.008
2	3.451	N2	2334	19682	0.039
3	3.823	N3	1164	11387	0.022
	4.556	N1	983	5966	0.011
	4.906	N2	586	3850	0.007
	5.160	N3	1336	7364	0.014
4	6.313	N1	123201	1137325	2.255
5	6.961	N2	4382	89106	0.176
6	7.406	N3	2798	32542	0.064
7	10.105	N1	5044	82768	0.164
8	10.500	N2	5499	99853	0.198
9	23.148	N	580150	24297556	48.180
10	28.153	N	8242	410122	0.813
	36.568	N	361504	24228328	48.043
Total Area				50429972	99.994

FIG. 48

Data: AKU.II.230D-furfural

Sample: AKU.II.230D
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.5 mL/min

Method: 0.5mL/Min.

Sampling Int: 0.1 Seconds

Data:

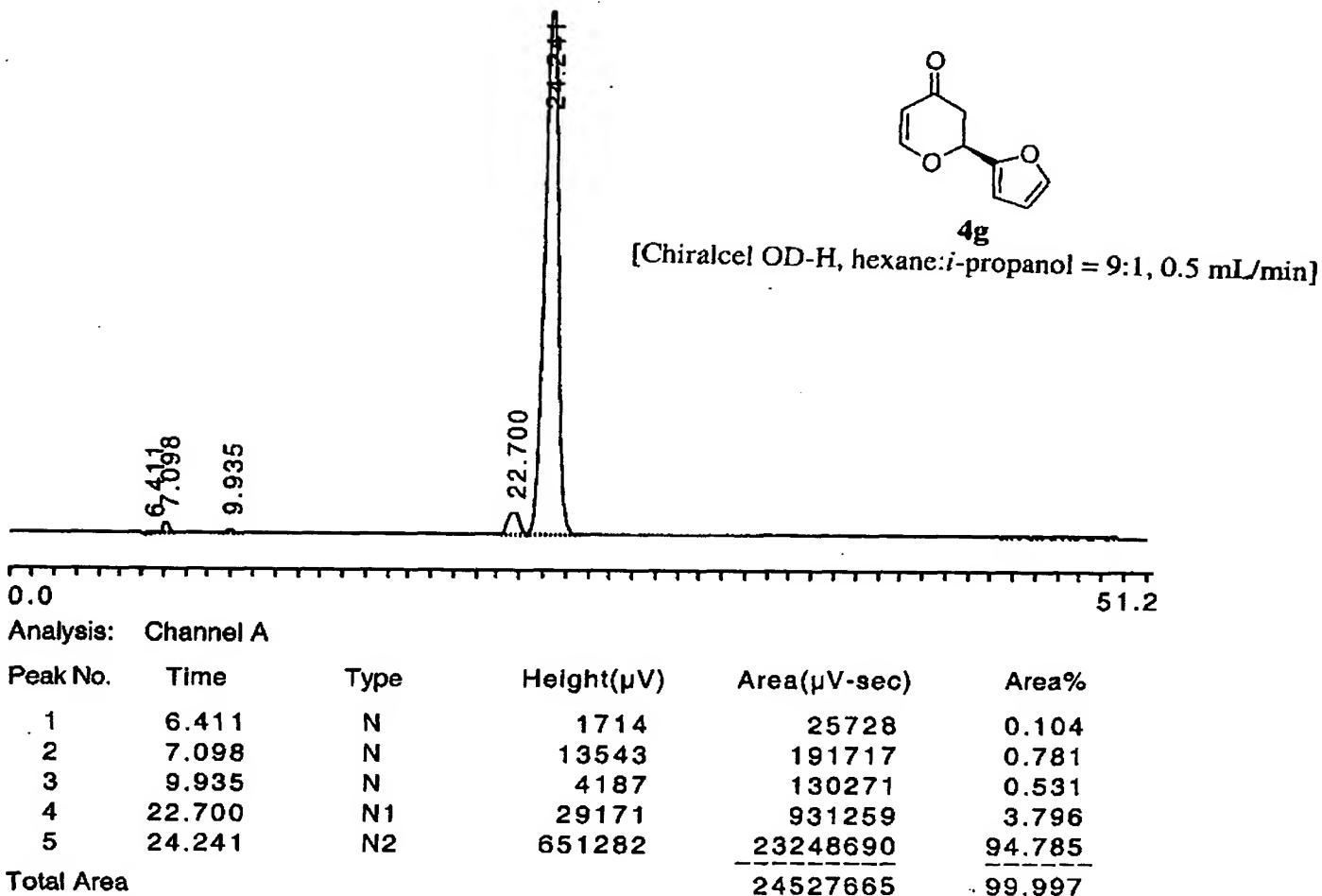


FIG. 49

Data: AKU.II.192C-racfutural

Sample: AKU.II.192C
Chiracel OD-H, 25cm
10% i-PrOH/Hexane, 0.5 mL/min

Method: 0.5mL/Min.

Sampling Int: 0.1 Seconds

Data:

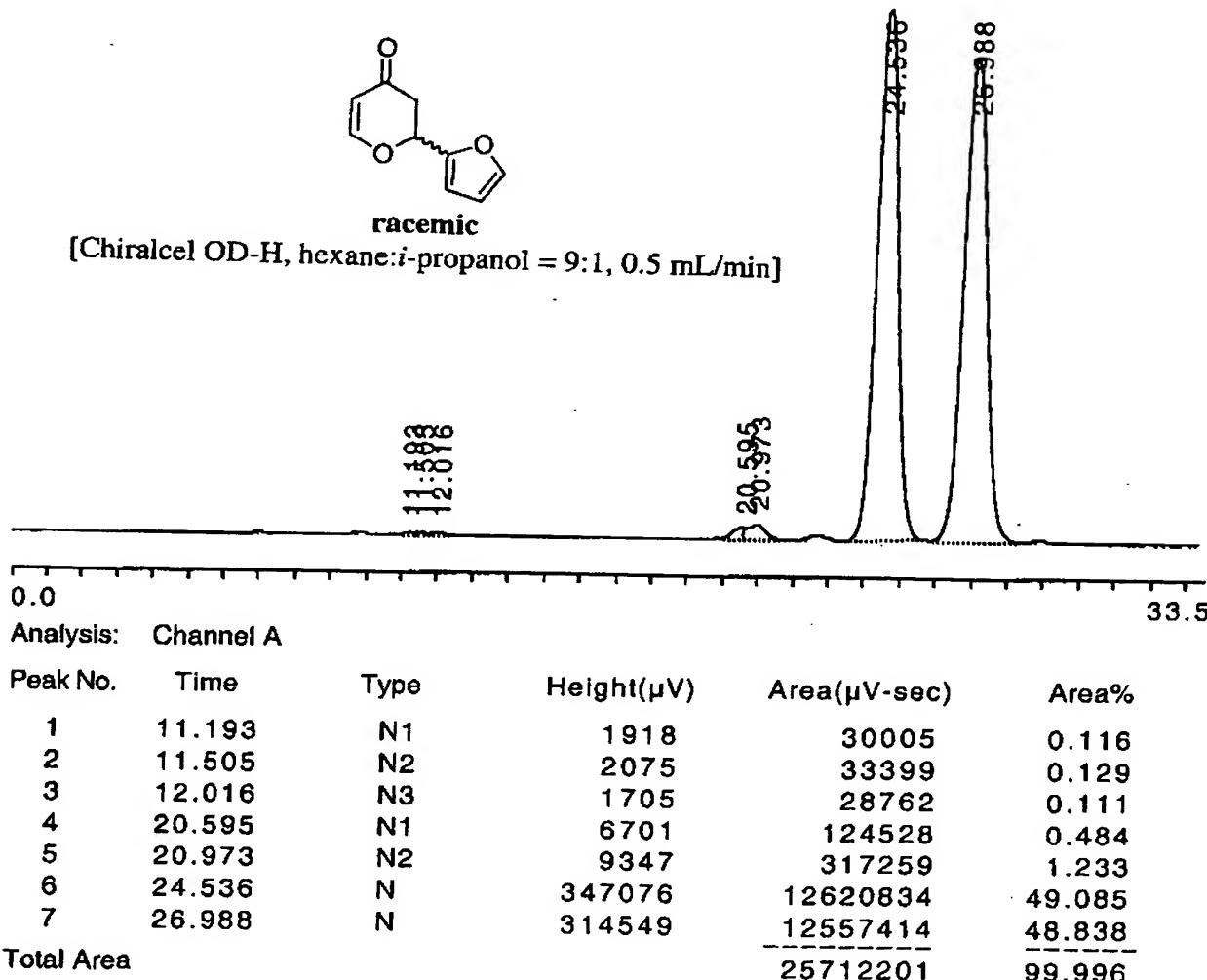


FIG. 50

Data: AT.cyclohexyl.20mol%.L.-40.24h

Method: 0.2mL/Min
Sampling Int: 0.1 Seconds

Data:

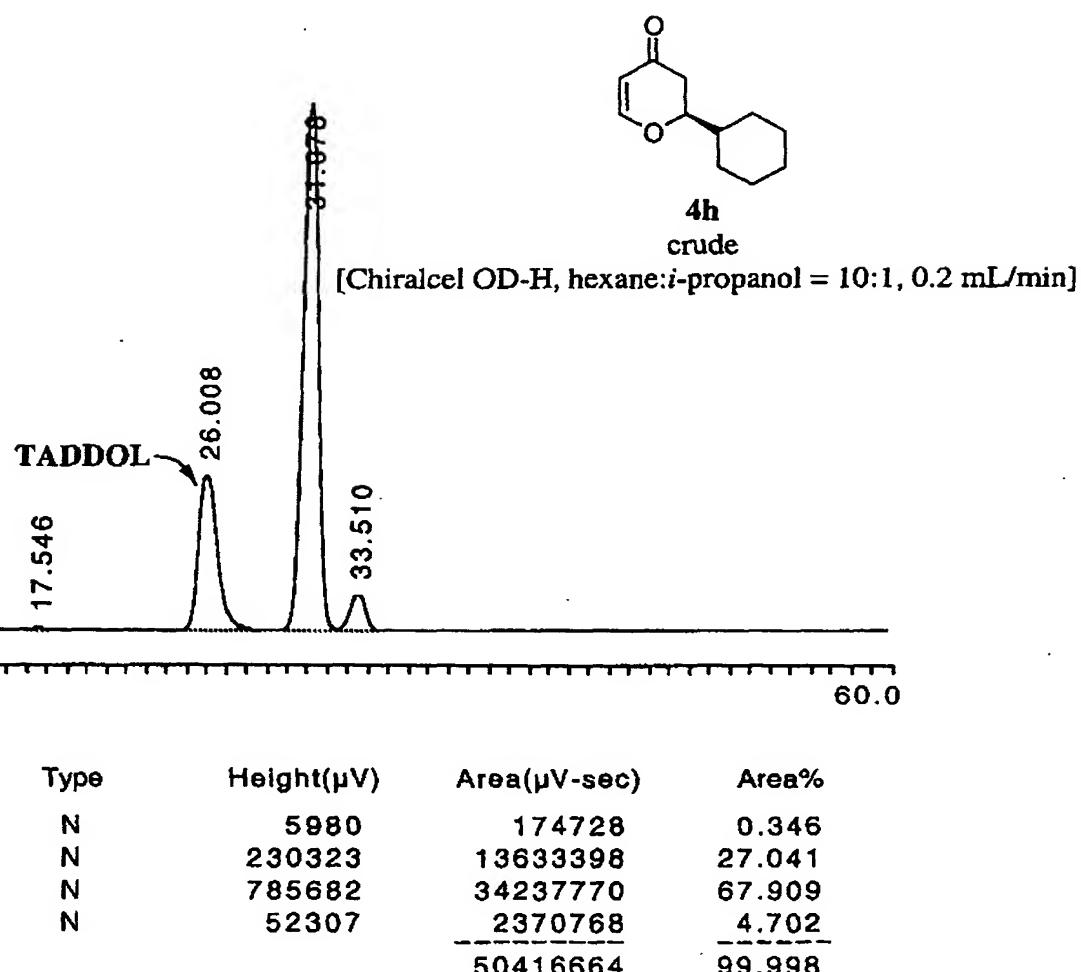


FIG. 51

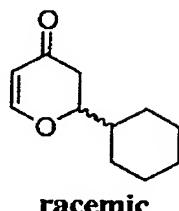
Data: AKU.II.145M cyclohex rac

Sample:

Method: 0.3ml/Min

Sampling Int: 0.1 Seconds

Data:



racemic

[Chiralcel OD-H, hexane:*i*-propanol = 9:1, 0.3 mL/min]

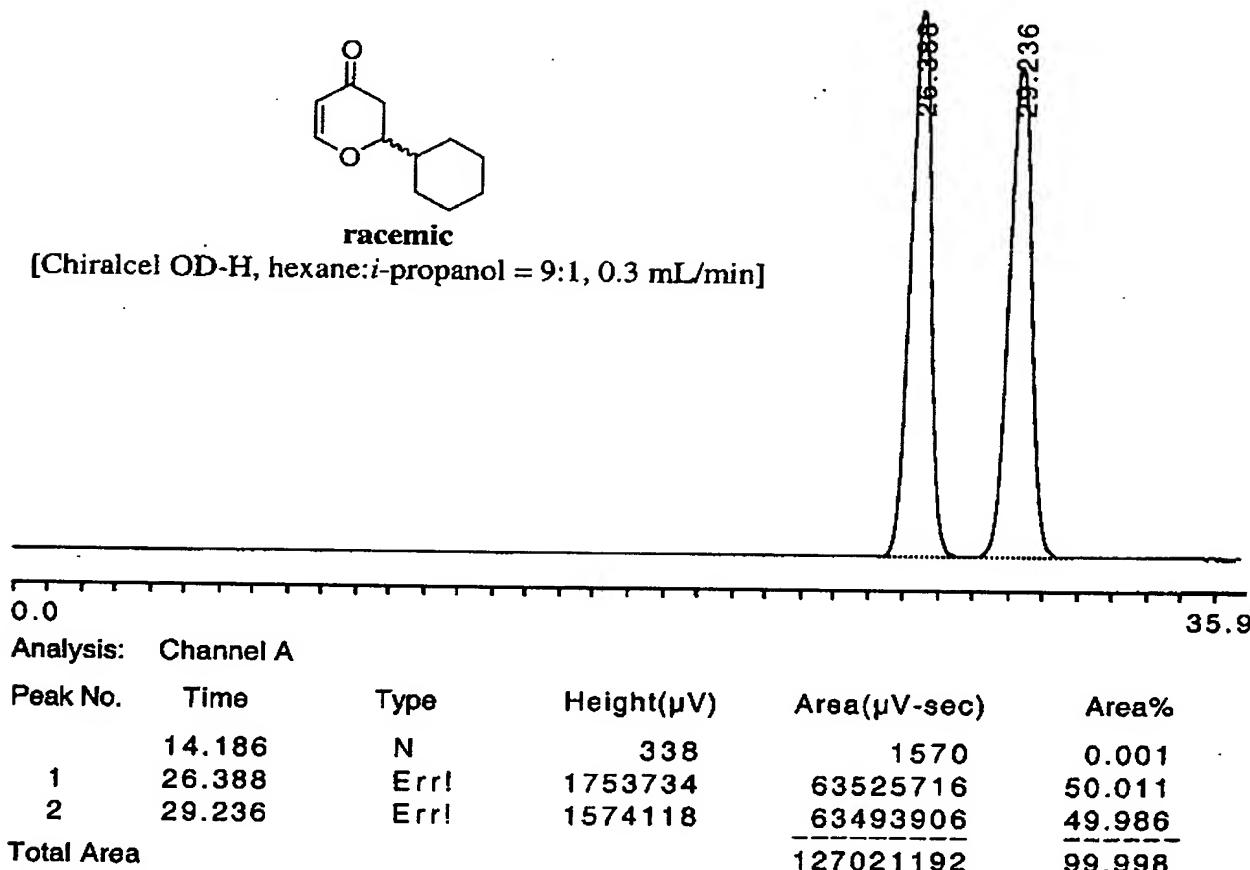


FIG. 52

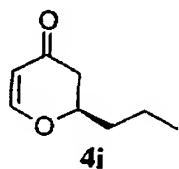
Data: AKU.II.228A-propyl

Sample: AKU.II.228A
Chiracel OD-H, 25cm
1% i-PrOH/Hexane, 0.5 mL/min

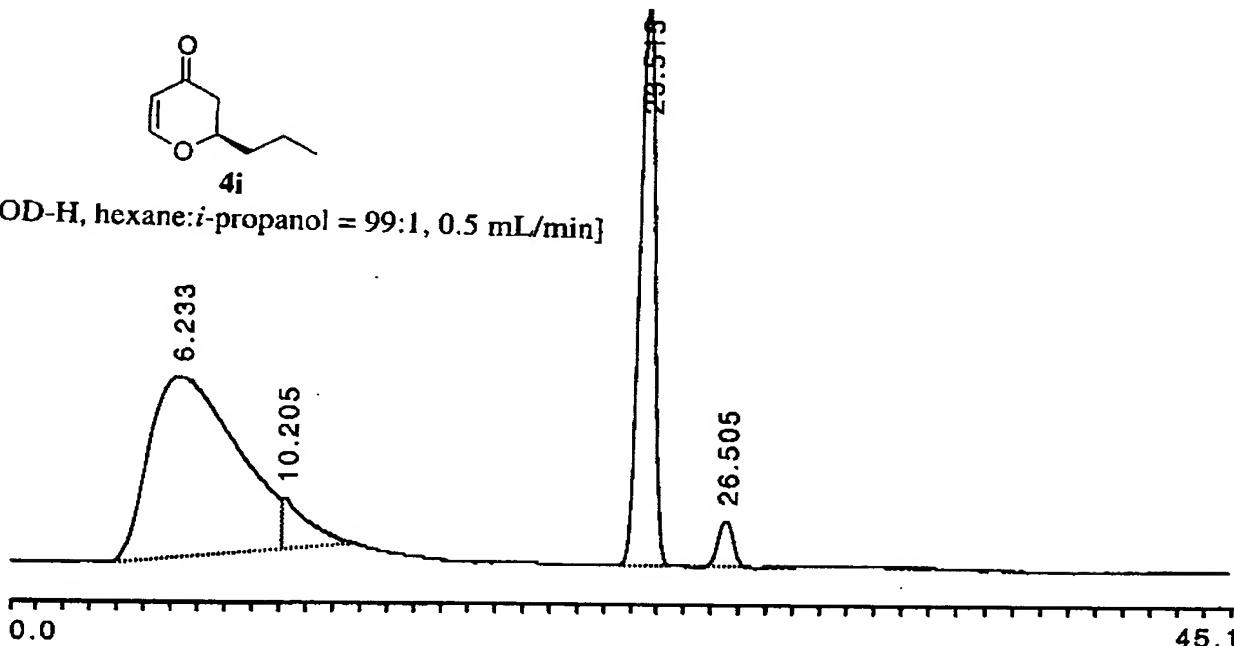
Method: 0.1ml/Min

Sampling Int: 0.1 Seconds

Data:



[Chiracel OD-H, hexane:i-propanol = 99:1, 0.5 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
1	6.233	N1	74384	16438908	63.336
2	10.205	N2	20930	1335791	5.146
3	23.515	N	231589	7483275	28.831
4	26.505	N	19769	696990	2.685
Total Area				25954964	99.998

FIG. 53

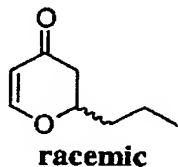
Data: AKU.II.224B-racpropyl

Sample: AKU.II.224B
Chiracel OD-H, 25cm
1% i-PrOH/Hexane, 0.5 mL/min

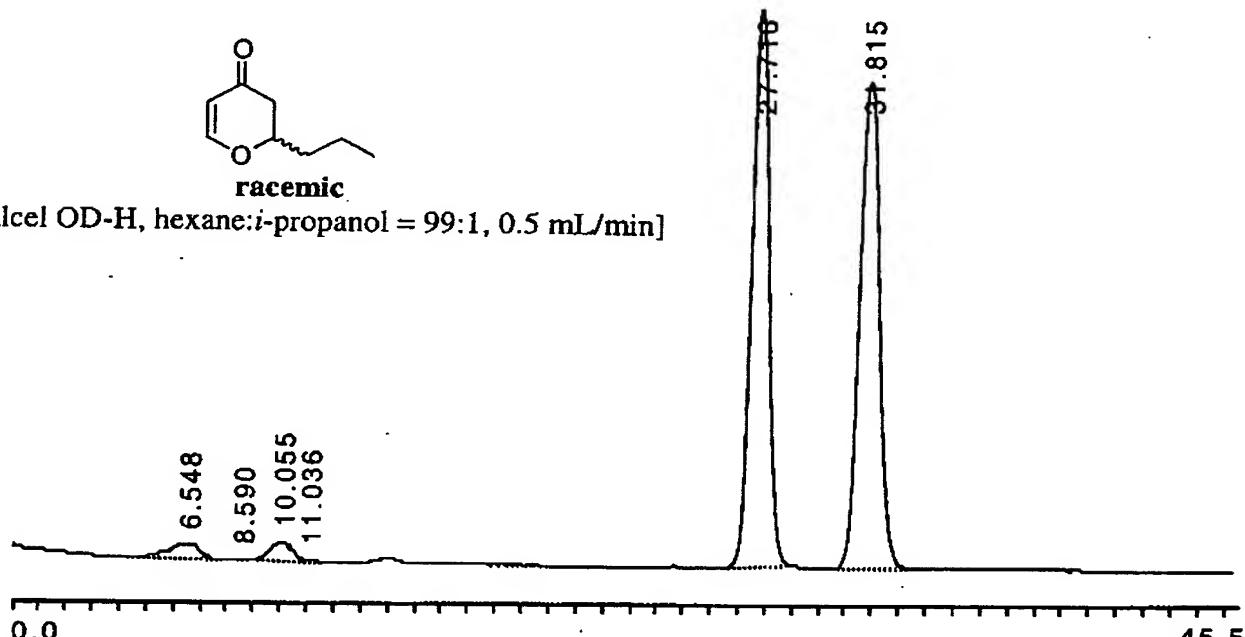
Method: 0.5mL/Min.

Sampling Int: 0.1 Seconds

Data:



[Chiracel OD-H, hexane:i-propanol = 99:1, 0.5 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(µV)	Area(µV-sec)	Area%
	4.206	N1	84	58	0.000
	4.663	N2	731	6970	0.017
1	6.548	N3	15822	1110879	2.743
2	8.590	N	1569	15858	0.039
3	10.055	N1	18436	897070	2.215
4	11.036	N2	1532	36228	0.089
5	27.716	N	482954	19209732	47.436
6	31.815	N	421016	19218838	47.459
Total Area				40495633	99.998

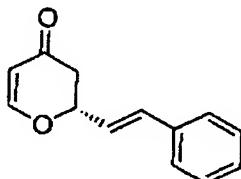
FIG. 54

Sample:

pyran-styryl
 OD-H
 20% i-PrOH/Hexane, 1.0 ML/min

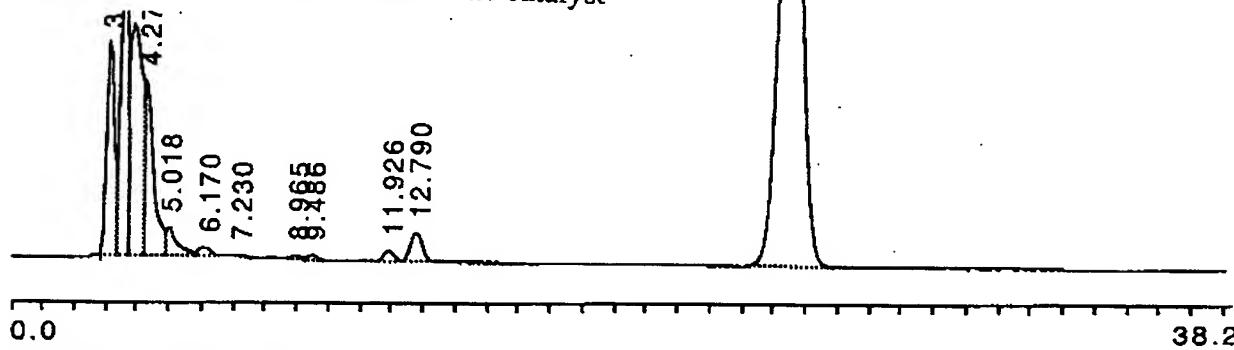
Method: general condition
 Sampling Int: 0.1 Seconds

Data:



4j
 crude

[Chiralcel OD-H, hexane:i-propanol = 4:1, 1.0 mL/min]
 note: ent-2 was used as the catalyst



Analysis: Channel A

Peak No.	Time	Type	Height(μV)	Area(μV-sec)	Area%
	2.821	N1	2189	880	0.002
1	3.126	N2	224396	2978829	6.902
2	3.571	N3	306241	4112288	9.529
3	3.885	N4	242989	5920349	13.719
4	4.271	N5	184504	3709344	8.595
5	5.018	N6	29215	642371	1.488
6	6.170	N7	8060	159135	0.368
7	7.230	N	2209	22532	0.052
8	8.965	N1	4560	71179	0.164
9	9.486	N2	4266	75218	0.174
10	11.926	N1	10308	204240	0.473
11	12.790	N2	29826	673380	1.560
12	24.488	N	554249	24583814	56.967
	37.145	Err1	423	642	0.001
Total Area				43154201	99.994

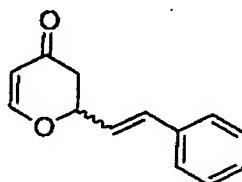
FIG. 55

Sample:

pyran-cinnamyl
OD-H
20% i-PrOH/Hexane, 1.0 mL/min

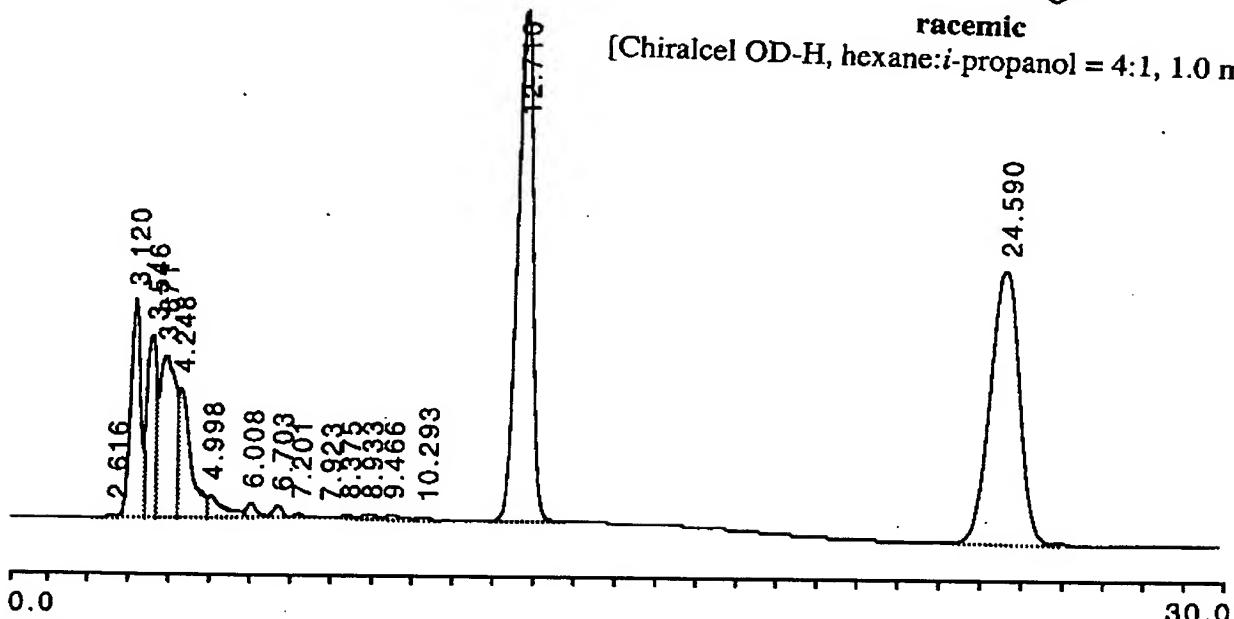
Method: general condition-30min
Sampling Int: 0.1 Seconds

Data:



racemic

[Chiralcel OD-H, hexane:i-propanol = 4:1, 1.0 mL/min]



Analysis: Channel A

Peak No.	Time	Type	Height(µV)	Area(µV-sec)	Area%
11	8.375	N2	6633	106844	0.115
12	8.933	N3	8896	160544	0.172
13	9.466	N4	7911	150553	0.162
14	10.293	N	3046	47285	0.050
15	12.710	Err!	1253481	28325212	30.501
16	24.590	N	671365	30885282	33.258
Total Area				92865604	99.993